

SCIENCE NEWS LETTER

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❖ Snow Made To Order

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GENERAL SCIENCE—AAAS

Research on Man Needed

In an address as retiring president of AAAS, President Conant of Harvard urges applying scientific method to study of how to live and work together.

➤ TO PRESERVE and continue that unique adventure in living that is the American way, scientific research must be undertaken on man's own activities, President James B. Conant of Harvard University declared in his address as retiring president of the American Association for the Advancement of Science.

President Conant spoke in full knowledge that many of his colleagues in the more or less exact sciences would regard as heresy any proposal to admit social studies to the ranks of acknowledged sciences. Himself a chemist of high standing as well as a successful university administrator, he "took the dare." Admittedly, he said, in the social sciences there is a high degree of empiricism—that is, in them there is little mathematical certainty and a great deal of plain cut-and-try.

But he called his colleagues' attention to an analogous situation in the ancient art of healing, where intensive and massive scientific research programs have greatly reduced the degree of empiricism and given the practitioner a cor-

respondingly greater amount of sure expectation. As much, he feels, can be done by applying the scientific method to "the likewise ancient art of counselling human beings as to how to live and work together."

As for the immediate future, President Conant expressed hopefulness:

"Conceivably we may all be blown up by atomic bombs within the next few years as some of my colleagues seem to think. Their reasons for this dire prediction, however, appear to me to be quite inadequate. I prefer the contrary assumption. I have faith that we shall be wise enough to escape a global war.

"I likewise believe that we will move forward to still greater strength and prosperity as a democracy, and that the morale of the nation will continually improve as we demonstrate that our American ideals are no mere myths or legends. And in this all important undertaking, I have confidence the skill and wisdom of the scientists cooperating with practitioners will play an important part."

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BIOLOGY—AAAS

Sex Evolution Traced

Cell reproduction is induced in "sexless" cells with synthetic grown hormone, making possible study of process. Brings out primitive ancestral characters.

➤ HOW SEX came into existence has apparently been shown in a study of cells usually considered sexless, with a growth-control chemical used to stimulate them into renewed multiplication. Details of the study were presented by Dr. C. Leonard Huskins of the University of Wisconsin. Associated with Dr. Huskins in his research were Lotti M. Steinitz, R. E. Duncan and Rhona Leonard.

The discovery started with a successful effort to induce division in plant cells no longer considered capable of this reproductive process, by treating them with dilute solutions of the syn-

thetic growth hormone, indole-3-acetic acid. Division readily occurred, revealing complex details of chromosome structure not hitherto reported. The divisions were of the type usually found only in the active sex cells of plants.

Sex evolution proceeded in four steps, according to Dr. Huskins' interpretation. First, nuclear division took place within the cell, without the cell itself dividing. Then there were mutations or evolutionary changes in the two that rendered each less efficient without the other—a kind of biological precedent for all romances. The third step was a halving of the chromosome numbers within the

In the past week, scientists gathered in Chicago for the annual Christmas meetings of the American Association for the Advancement of Science. This issue contains many reports from the meetings as indicated by AAAS in the line above the head. More will follow next week.

body-cells. Finally came the union of the two "incomplete" cells into one, which is the physical basis of all sex.

The great complexity of structure which Dr. Huskins and his co-workers discovered in chromosomes is likely to have far-reaching effects, both in genetic theory and in practical plant and animal breeding. Genes, the units of bodily inheritance, hitherto regarded as indivisible units, may now have something happening to them like what happened to the atom—it looks as if it will turn out to have a more or less elaborate internal structure, which in turn will make its modification possible.

One thing that happened in stimulated "sexual" division of body-cells in strawberries and oats was the appearance of plants of primitive, presumably ancestral character. This promises to make possible the finding of elusive "wild" ancestors of cultivated plants simply by breeding them out of their more complexly developed descendants.

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RESOURCES—AAAS

Soft Coal Called Key to Nation's Continued Power

➤ NOT atomic power, but old-fashioned coal—dirty, smoky soft coal—is the key to America's continued prosperity and power, scientists heard from Prof. S. W. Hockett of Iowa Wesleyan College.

Prof. Hockett described some of his own experiments on Iowa coal, which is quite literally the Cinderella of American soft coals. By carbonizing it at relatively low temperatures—around 500 degrees Centigrade—he was able to produce good, easily cleaned fuel gas, a high-grade, easily ignited coke, and an abundance of coal tar products.

Small units for low-temperature carbonation of soft coal have recently been developed, he stated. It appears feasible to move them about on trucks so that they can operate at the pit-head or even down in the mine itself. Gas thus produced can be either piped to nearby cities or bottled and sold to rural users. Shipping costs should be much lower on the more compact products of the new technique.

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NUCLEAR PHYSICS-AAAS

Predict Heavier Elements

Numbers 97 and 98, undiscovered as yet, pose a major difficulty in finding the necessary starting materials. May have masses as high as 247 and 248.

➤ THE synthetic manufacture and identification of chemical elements heavier than curium, number 96, at present tops in atomic number and weight, will be possible, Dr. Glenn T. Seaborg of the University of California predicted in the Sigma XI lecture before the American Association for the Advancement of Science in Chicago.

The major difficulty in making new undiscovered elements 97 and 98 will be finding the necessary starting materials, he told the scientists. From their knowledge of how these heaviest elements are built up, the chemists can predict that the most stable and the longest-lived varieties or isotopes of elements 97 and 98 will have masses as high as 247 and 248 and higher.

Curium's heaviest isotope is only 242 and from it upward is quite a jump.

However, Dr. Seaborg has some good guesses about the chemical properties of such new elements, and he intends to use this information in attempting to create the new elements in the future.

Co-discoverer of atomic bomb element, plutonium, 94, as well as americium, 95, and curium, 96, Dr. Seaborg explained that of the 96 known elements, 94 have been isolated in quantities sufficiently large to see and weigh them. Astatine 85 and francium 87 may never be separated out in such quantities and in Dr. Seaborg's opinion may remain unique in being the rarest of chemical elements.

Eight chemical elements, four of them beyond uranium 92, and four filling gaps in the periodic table, at 43, 61, 85 and 87, have been discovered within the past ten years.

The metals gold, silver, copper, iron, lead, tin, mercury and also possibly zinc, as well as the non-metals, sulfur and carbon, were all known and written about some 2,000 years ago. A number of these were known 5,000 years ago and some probably were recognized and used in prehistoric times, Dr. Seaborg declared. The alchemists identified the substances arsenic, antimony and bismuth during the period from the twelfth through the sixteenth centuries. Platinum was probably the "white gold" of that period.

The first individual identified as a chemical element discoverer was a German merchant, Hennig Brandt, who first brought to light the element phosphorus in 1669. A dozen elements were discovered in the eighteenth century, while most of the remaining elements, about 60 in

all, were discovered in the nineteenth century.

The atomic weights of the elements are based upon the lightest of them, hydrogen, taken as one, and until the discovery of the four trans-uranium elements, uranium was the heaviest, with a variety or isotope 238 times the weight of hydrogen as the most prevalent natural form of this relatively rare element. The elements were also arranged in order by atomic numbers, from hydrogen 1 to uranium 92 by H. G. J. Moseley, killed in the first World War, and this is now extended to curium 96.

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ENGINEERING

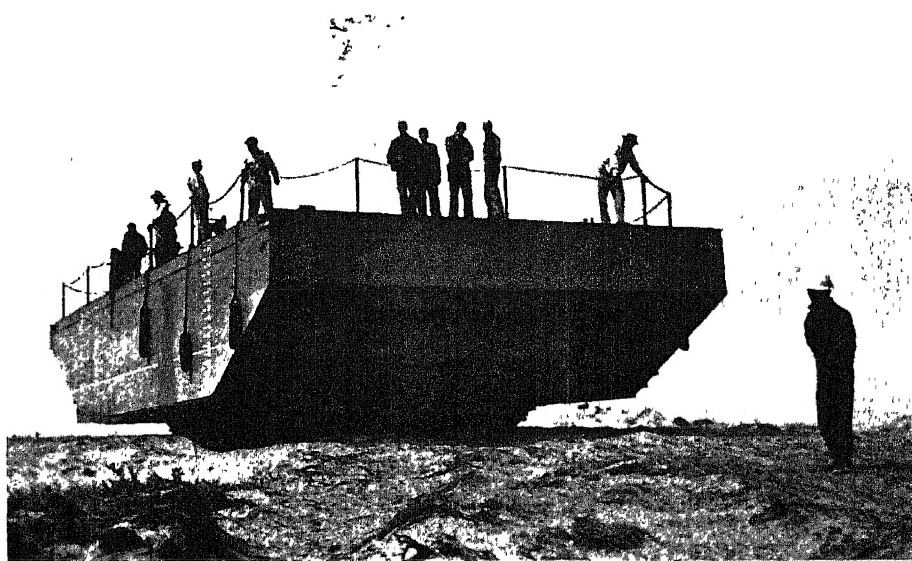
Barge Climbs Banks

➤ THE latest thing in a seaboat that will travel on land is a new Navy amphibious vessel. It is called a "walking" barge, and it can navigate through surf, soft mud, sand and quagmires as well as sail the ocean or climb embankments.

It is dubbed a walking barge because of its method of travel when out of sailing water. It consists of three lengthwise pontoons placed side by side. The

center pontoon can be raised 17 inches, moved forward ten feet, and lowered. Then the two side pontoons step forward in a similar way, and do so at the same time.

The vehicle can carry 60 tons of men and cargo. Each of the outer pontoons is 60 feet long, six feet wide, and slightly more than nine feet high. The center pontoon is 44 feet long, 16 feet wide



WATER-LAND BARGE—This is a model of a "walking" barge which can haul 60 tons of men and materials across mud, sand and surf; it is propeller driven in the water and is completely amphibious.

and six feet high. The entire barge is of all-welded construction, and all three pontoons are divided into watertight compartments.

The craft has now successfully passed initial tests. These included climbing steep embankments in addition to travel in mud, sand and surf. Traction in mud

flats is obtained through vertical fins installed in the bow of the inner pontoon and in forward sections of the others. They are automatically raised into the hull as the barge makes a forward step and lowered into the mud when it touches.

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PSYCHOLOGY-AAAS

Stress May Be Ulcer Clue

➤ MEN are more likely to have stomach ulcers because women, although they react more to stress, relax more rapidly and recover more quickly.

The answer to sex differences in ulcers is explained by the way boys and girls react to stress, Dr. L. W. Sontag, of the Fels Research Institute, Yellow Springs, reported.

Dr. Sontag found that girls react more to stress, but that they also relax and recover more effectively than boys. The experiments included plunging a child's hand or foot into cold water for a minute, or tilting the person tested head down at a 45-degree angle for two and a half minutes, and then measuring changes in heart rate, blood pressure,

electrical resistance of the skin, and other physical clues to emotion.

Although the shock of cold water or turning upside down is purely physical, Dr. Sontag explained that it produces almost exactly the same kind of physiological changes as do shocks of a mental or emotional nature.

Dr. Sontag's findings fit in with facts discovered earlier in collaboration with Dr. Hudson Jost. Cousins were found to be much more alike in reaction to stress than unrelated children. Brothers or sisters are more alike than cousins, and identical twins are even more alike.

All this suggests to Dr. Sontag that the way a person behaves under stress is in part due to his inheritance.

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ETHNOLOGY-AAAS

Baby Care Just Average

➤ AMERICAN infants get just about average treatment compared with babies in other parts of the world, Dr. John W. M. Whiting, of the State University of Iowa, is convinced.

How mothers of 85 different peoples, including the U. S. A., feed their babies and wean them, teach them manners in regard to toilet habits, give sex instruction or prohibitions, train them to be independent and to control aggression, was studied by Dr. Whiting in collaboration with Dr. Irvin L. Child, of Yale University. The American study was conducted on "middle-class" mothers.

American mothers, they found, seem to be in a big hurry to start training their babies. American babies are weaned earlier and must get their toilet training and sex training way ahead of most other children.

But the American mother does not hold the record for nonindulgence in nursing her baby. That goes to a Polynesian tribe, the Marquesans, where the mothers believe that nursing the baby

will spoil their beauty. Feeding times have nothing to do with the protests of the child. Only in this tribe, among the Maori, and in the American middle class, is the baby weaned before he is a year old. Two societies do not wean their youngest children at all, but the average is two and a half years.

Babies are trained in modesty all over the world, even where adults do not wear clothes. The Kwoma of New Guinea, for example, teach girls to sit modestly and boys not to stare at girls or women. Americans have a just average rating in modesty.

In this tribe, the lucky babies receive the most indulgent care from their mothers. The tribe is polygynous, and when the baby is born the mother is excused from all household and gardening cares, and devotes herself entirely to the baby until the child is weaned. During this time, the co-wife must do all the other work.

In punishment for aggression, again the American middle-class stands on

middle ground. Among two peoples, the Lepcha and Hopi, aggression is discouraged completely and consistently from birth. The Kwoma, on the other hand, give specific encouragement and training in aggression during childhood. Ratings were made separately for physical aggression, verbal aggression, property destruction and wilful disobedience. Property destruction is punished most severely, wilful disobedience next. Least severely punished form of aggression is physical aggression.

With regard to severity, the American mother takes her place at the most harsh end of the scale with regard to sex and toilet training. She is most indulgent in training for independence. She is just average in weaning her baby and in teaching him to control his aggressiveness.

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Instrument Measures Height Of Radio Reflecting Layers

➤ RADIO broadcasts will come through more clearly because of a new instrument that helps select the best radio frequencies to use for broadcasts. It shows automatically what is happening to the invisible layers of the earth's upper atmosphere. It is this series of ionized layers, 50 to 250 miles above sea level, that bounces radio waves back to the earth and enables us to hear distant broadcasts.

Several months in advance the National Bureau of Standards predicts the best radio frequency for large radio companies and radio "hams" to use in getting messages through to listeners at distant points. When there is little ionization, only a narrow band of frequencies can be used successfully.

Radio waves come through most clearly when the upper atmosphere, or ionosphere, contains a large number of electrons knocked out of atoms.

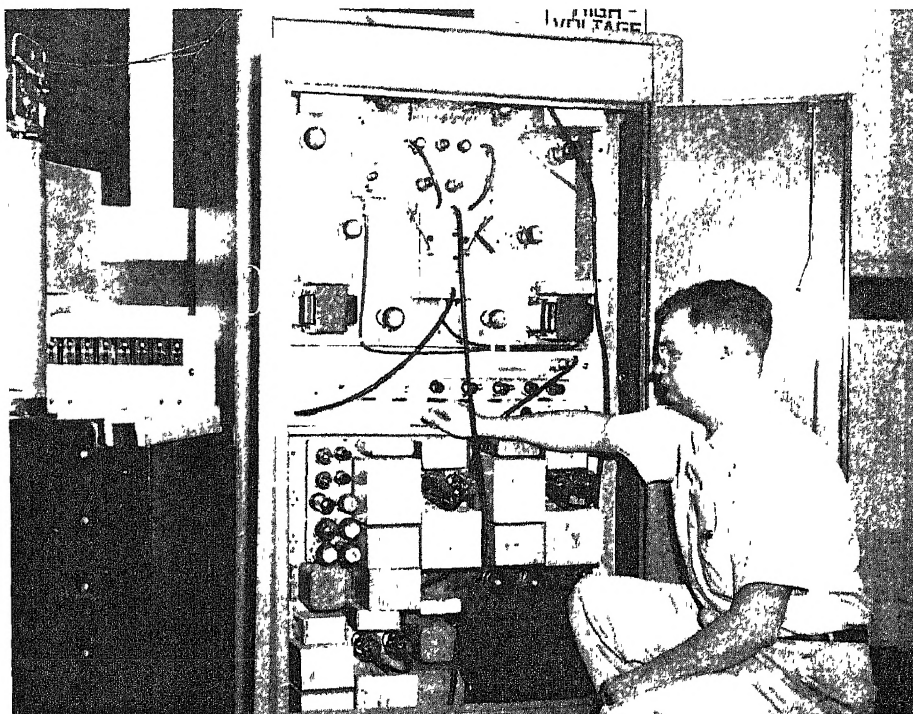
The recorder shows the height of the echoing layer by measuring the time it takes for a radio signal to be bounced back. Within seven and a half seconds it can determine the lowest and highest layers of the ionosphere that will return a signal. This information helps make up-to-the-minute forecasts on how well shortwave broadcasts will get through.

Plans have been made to install these instruments in the Bureau's many ionosphere stations operated throughout the world. One is now working at the ionospheric research station at Sterling, Va., busily collecting the information needed for radio forecasting. The first model was developed by the Bureau's Central Radio Propagation Laboratory in time to study how last summer's eclipse affected radio propagation.

An innovation in this model is the incorporation of a motion picture camera in the apparatus. Here curves showing what is happening to the ionized layers of the sky are recorded on motion picture film. By rapidly projecting this series on a screen, radio experts get a good idea of what is happening to the invisible reflecting layers.

This improved recorder promises to aid us in determining how best to get radio messages through. It will also tell us more about radiations from the sun and physical conditions of the earth's outer atmosphere.

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BETTER RECEPTION—This new instrument registers automatically the height of invisible layers of the earth's upper atmosphere, which are responsible for distant broadcasts getting through by bouncing radio waves back to the earth. It is possible with this instrument to predict best radio frequencies for broadcasts.

BIOLOGY-AAAS

Body Collects Radiocarbon

Beeswax and wood charcoal show just about the same radioactivity found in new methane occurring in sewage, confirming theory.

➤ YOU have radioactive carbon in you. You will continue to have it even after you die, and if there is anything left of your remains 5,000 years from now, the radiocarbon in them will still be able to make a Geiger counter tick.

Experiments proving that all living things are collectors of radioactive carbon, C14, were described by Prof. Willard F. Libby of the University of Chicago. The work was done by a group of research workers, under the joint auspices of the Institute for Nuclear Studies at the University and the Houdry Process Corporation.

Theoretical considerations pointed to the probability that radioactive carbon is produced in the upper atmosphere through cosmic-ray bombardment, and then is concentrated in living plants and animals. Such carbon has a measured half-life of 5,000 years.

Following a first demonstration of its actual presence in methane produced by bacteria in sewage, Prof. Libby and his associates have now proven its existence in beeswax and wood charcoal. These substances show just about the same radioactivity as is put forth by the sewage methane. As a check, methane from petroleum was tested, and found quite devoid of radioactivity. Although petroleum had an ultimate source in living creatures, they have been dead so long that all their radioactive carbon atoms have "died", too.

One possible application of this new discovery, Prof. Libby said, is the more accurate determination of the age of recent geologic deposits. If they are less than 40,000 years old, the traces of radiocarbon can be measured to calculate their age.

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CHEMISTRY-AAAS

New Rat Poison Potent

Castrix is reported to be five times more effective than ANTU and 1080. It is also poisonous to dogs, cats and other animals.

➤ CASTRIX, a poison even rougher on rats than the recently announced ANTU and 1080, made its bow at the meeting. Prof. Kenneth P. DuBois who gave out the bad news for rodents, developed the compound from a German formula in the University of Chicago's Toxicity Laboratory on a project sponsored by the U. S. Chemical Corps.

Castrix, he said, is at least five times more effective than ANTU and 1080, is readily accepted in rat baits, and does not produce a tolerance if it fails to kill the first time. It produces violent convulsions, which end in death in less than an hour.

Like 1080, it is poisonous to dogs, cats and other animals; but it has effective antidotes in the barbiturates, already widely used in human medicine as sleep-inducing drugs. An animal given 20 times the ordinary lethal dose would recover after the administration of a barbiturate, even though convulsions had set in. Castrix is thus the only highly toxic rat poison that has an effective antidote.

2,4-D Injures Cotton

➤ COTTON seems to be one of the most sensitive of all plants to the weed-killing chemical 2,4-D, so when 2,4-D was dusted on water hyacinth and rice-field weeds in Louisiana last summer some sensational damage was done to neighboring cotton fields by dust that drifted to where it had no business to be.

Among the symptoms of 2,4-D injury described by Prof. Clair A. Brown of Louisiana State University, were leaves with abnormally long points and ruffled margins, malformed flowers with dwarfed petals grown together, and worst of all a premature dropping of buds and flowers with corresponding reduction in yield. Losses of as much as 60% of the crop were reported.

Elm Disease Remedy

➤ TREATMENT for elm trees afflicted with the fungus blight that has been improperly christened the Dutch elm disease may be at hand, Dr. Albert E.

Dimond of the Connecticut Experiment Station told of watering the ground around half of a grove of 200 purposely infected elms with a solution of oxy-quinoline benzoate, leaving other trees supplied with water only as controls. After three weeks, 47 of the untreated trees showed marked symptoms of the disease, while only 29 of the treated trees were visibly sick.

Don't Go to Ant

➤ THE world's most completely socialized beings—bees, ants and termites—do not afford models which man will ever be able to follow, even if he should want to, Prof. Ernest N. Cory of the University of Maryland declared at the meeting. Prof. Cory spoke as retiring president of the American Association of Economic Entomologists, an affiliated organization.

These insects, which have developed highly efficient, almost frictionless communities through ages of evolution, have done so only at the expense of eliminating practically everything that makes human beings human, the speaker pointed out. There is no such thing as individual initiative, not even much that could be recognized as individual wish or impulse. Any given insect's position in the colony, as well as its work and its whole life activity, is predetermined literally in the cradle.

Insects on Bikini

➤ INSECTS on the islands of Bikini atoll seem to be calmly unconscious that there ever were such things as atom bombs. It seems more likely that if any disturbance in the natural insect population of the area took place it came as a result of a mass DDT-ing of the islands before the tests, to abate the plague of flies.

Dr. A. C. Cole, Jr., of the University of Tennessee, who participated in the scientific resurvey of the islands last summer, regretted that no insect survey had been made prior to the dousing of the area with DDT, because now it is impossible to obtain any basis for comparison.

Phosphate Gardens

➤ PEBBLE PHOSPHATE rock from Florida, and crushed phosphate rock with the natural fluorine removed were two of the "gravel" varieties used in experiments on soilless cultivation of hot-house flowers conducted by Dr. Neil W. Stuart of the U. S. Department of Agriculture at the plant industry station at Beltsville, Md. This phosphate-rock "gravel" supplied all the phosphorus the plants needed for thrifty growth, Dr. Stuart reported.

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ASTRONOMY

Meteors Spotted by Radar Better Than Visually

➤ "SHOOTING STARS" are "seen" three times as often as radar echoes as they are spotted visually in the sky, if the experience of a group of Canadian astronomers is typical.

On five consecutive nights last August, when the shower of "falling stars" that each year seems to radiate from a point in the constellation of Perseus was at its height, meteors actually seen and those appearing on the radar scope were counted. A total of 3,700 radar echoes and only 1,100 visual meteors were recorded, during this, the year's best shower, Dr. Peter M. Millman of the Dominion Observatory, Ottawa, stated at the meeting of the American Astronomical Society at Columbus, Ohio.

Over 100 radar echoes lasting five seconds or longer coincided with the appearance of the brighter Perseid meteors—those as bright as the brightest stars in the sky. Not more than three of these could have coincided by chance, Dr. Millman estimates. But for 54 more of these brightest meteors there was no echo at all on the radar scope. This lack of a radar echo is puzzling.

Radar echoes lasting less than five seconds were 12 times as numerous as those of longer duration. For these, not enough "falling stars" were seen in the sky at the same time for any connection between the two to be considered.

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Great quantities of *synthetic rubber* will be used in the future, it is expected; alloyed with certain plastics they form a tough, resilient floor tile which is unaffected by oils and grease.

Attachment cords for kitchen electrical appliances should be kept free of grease or the rubber insulation may rot.

ASTRONOMY-AAAS

Navigation Simplified

Now possible to determine position of ship or plane in five minutes by sighting two stars at same height above horizon.

➤ A NEW method of determining the position of a ship at sea or a plane in the air that requires only five minutes of simple computation has now received approval by navigators and astronomers.

Based on spotting two bright stars when they are exactly the same height above the horizon, at sea the marine sextant was found adequate and in the air the bubble octant was sufficient. Thus no novel instrument is needed, O. C. Collins of the University of Nebraska stated.

Tests at sea and in the air show that navigators can obtain the latitude and longitude of a ship much more quickly and with far less effort than by methods now in use, Mr. Collins said, yet the result will be fully as accurate.

During the last 18 months the Army, the Navy, the Merchant Marine and American Overseas Airlines have co-operated in testing the new method and found it satisfactory, the University of Nebraska astronomer stated. It can be used 90% of the time that celestial observations can be made.

Gas on Planets?

➤ IF LIFE on some planets is impossible because of the presence of poisonous gas, astronomers will soon know about it. A search for carbon monoxide, the "garage gas" responsible for many deaths, in the atmosphere of Mars, Venus, Jupiter and other planets is being conducted by Dr. G. P. Kuiper at the McDonald Observatory of the University of Texas.

Only one of the satellites of Jupiter may have had an atmosphere at one time, Dr. Kuiper stated. Its reddish color is in striking contrast to the other three satellites. To date no detectable atmosphere has been found on the distant planet Pluto or on Neptune's satellite, Triton.

Lots of Stars Needed

➤ NUMEROUS stars must be visible in the background during a total

eclipse of the sun if we are to determine just how much the star positions undergo Einstein shifts at eclipse time, Dr. G. Van Biesbroeck of Yerkes Observatory stated.

The stars were not close enough to the sun during last spring's eclipse for the shift to be measured accurately. Not until 1955, when a five-minute eclipse will be visible in the Philippines, will there be a new and better opportunity to test the theory of relativity in this manner.

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ARCHAEOLOGY

Toys on Wheels Made in Mexico Long Before Carts

➤ TOYS on wheels were made by the Indians of Mexico many centuries before Cortez reached the New World. Wheeled toys made in pre-Conquest times, long before carts on wheels were introduced from Europe, have been found in the Valley of Mexico, in central and north-

ern Vera Cruz, and possibly in Oaxaca. Not just a fad that quickly passed, wheeled toys were made over a period of at least several hundred years.

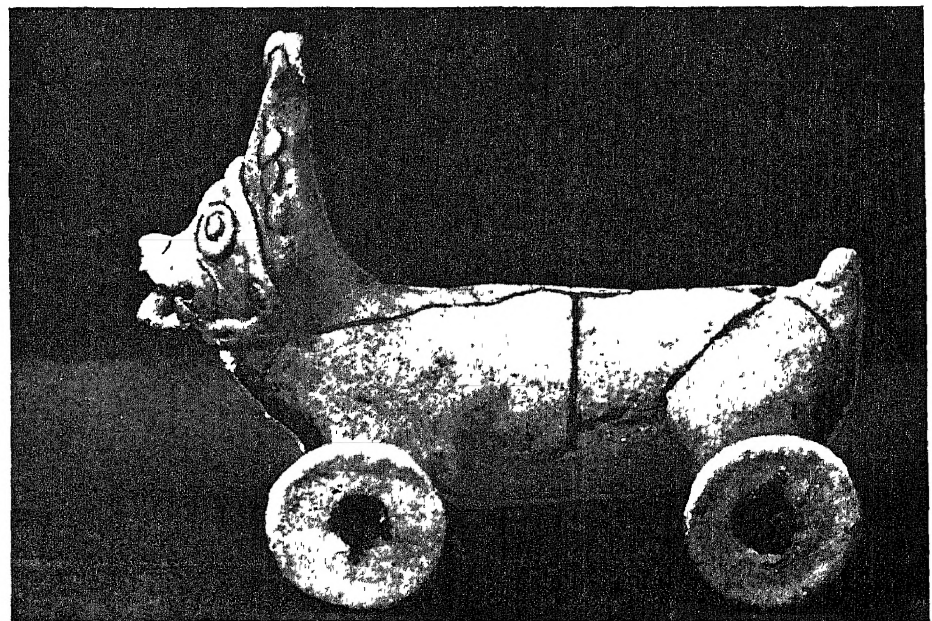
The broken body of a figurine recently found in the town of Panuco, Vera Cruz, was discovered with the wheels in position, Dr. Gordon F. Ekholm of the American Museum of Natural History revealed. The axle, probably of wood or some other perishable material, was missing. Spots of asphalt near the central holes of the wheels indicate how the axle was held in place.

Several other toys have been found with tubular holes for the axle and perforated disks nearby. The holes in a tiny model found in Oaxaca are definitely worn smooth by turning axles.

These miniature vehicles were not copied from actual carts used in transport, Dr. Ekholm points out. Wheeled vehicles were not actually used as a means of transport anywhere in the New World in pre-Conquest time. Nor is it likely they were introduced from Europe at some earlier period.

Toys on wheels probably were a pure discovery or invention that was not put to practical use. A spindle with its whorl may have given someone the idea of the use of a wheel on a vehicle and he may simply have made a workable model of clay in the form of an animal. The crude workmanship of the wheels eliminates the possibility of these disks having been used in spinning.

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ANCIENT TOY—This toy with wheels was discovered in Vera Cruz. Asphalt near the central holes of the wheels indicates how the axles were held in place.

AERONAUTICS

Suggest Landing Planes In Greased Trough Runways

➤ A SCHEME for an airplane landing field that looks as if it had been inspired by watching a greased pig on an ice-hockey rink is the subject of newly-issued U. S. patent 2,433,238. The inventor, Humberto V. Ramirez, of Los Angeles, proposes to equip planes with streamlined resilient torpedo-shaped bodies instead of landing wheels, and to have the planes come down on runways consisting of long, shallow troughs containing a lubricant. Longitudinal flutings or ribs are to be provided, to give the plane the benefit of automatic steering as it slides to a stop.

This bold and unorthodox suggestion is an attempt to solve the rather tough problem presented by the rapidly increasing size of transport planes and the great weights they now carry. In order to double the landing surface of plane wheels, Mr. Ramirez points out, it is necessary to quadruple their size.

Lubricant costs need not be an insuperable obstacle to the adoption of the new landing system. Ordinary muddy water will work quite satisfactorily.

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ENGINEERING

Inside-Out Motors Built For Wind Tunnel Tests

➤ TWO new electric motors, revealed by General Electric, are unique. The first, a tiny spinner for use in testing missiles in wind tunnels, is dubbed an "inside out" motor. The second has speed regulation by a twist of a dial on the motor itself.

The inside-out motors have their rotating part on the outside and their stationary part on the inside. Ordinarily, the rotor is on the inside, enclosed by the stator which is the stationary part of an induction motor on which the field windings are placed to create an electric field. In this new motor, the rotor encloses the stator, revolving on a stationary shaft.

The motor is six inches long and less than two in diameter. It is rated at one-tenth horsepower, and has an extreme speed of 80,000 revolutions per minute. When mounted inside a missile, the exterior frame of the motor is fastened to the projectile's case, spinning it at high speeds so that its behavior in the air at supersonic velocities can be ob-

served and measured.

The second motor will be produced in ratings of from three to 200 horsepower. Its feature is a stepless-speed adjustment, over a three-to-one ratio, by simply turning a dial. The entire unit, with the exception of the starting control, is in a housing only slightly larger than constant-speed motors of comparable ratings.

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PHYSIOLOGY

Chronic Alcoholics Escape Atherosclerosis, Cancer

➤ CHRONIC alcoholics escape one kind of artery hardening and cancer, it appears from figures reported by Dr. Sigmund L. Wilens of Bellevue Hospital and New York University College of Medicine in the *Journal of the American Medical Association* (Dec. 27).

One reason the chronic alcoholics get the special artery hardening less often than non-alcoholics is the relatively young age at which the alcoholics die.

Age at death, however, does not entirely explain the "remarkable resistance" to cancer shown by the alcoholics, Dr. Wilens states.

The blood vessel disease he studied is atherosclerosis, a kind of artery hardening in which the walls of the arteries undergo fatty degeneration. The word atheroma comes from the Greek for porridge or mush.

Fatty material has been found in the cysts in the artery wall in this condition. Scientists have therefore thought diets high in fats and perhaps proteins, also, led to the condition.

But the chronic alcoholic, if he drinks a pint of whisky a day, which is likely, probably gets most of his calories from the whisky. A pint would furnish 1,750 calories. So, even if he doesn't lose weight, he gets little fat or protein.

The finding that atherosclerosis attacks chronic alcoholics less often than non-alcoholics means, Dr. Wilens points out, that the fatty materials in the cysts in the artery walls do not necessarily come as such from the food eaten. They may, instead, be elaborated in the body from other substances.

Besides the relatively young age at death, the low incidence of high blood pressure and lesser tendency for damage in heart and brain, Dr. Wilens says, probably account for the apparent low incidence of atherosclerosis in chronic alcoholics.

Science News Letter, January 3, 1948



Find Male-Sterile Carrot Unable To Form Pollen

➤ CARROTS that are male-sterile, that is, unable to produce pollen although their flowers have female parts capable of forming seed when cross-pollinated, are reported in the journal *Science* (Dec. 12) by J. E. Welch and E. L. Grimball, Jr., of the U. S. Department of Agriculture experiment station, Charleston, S. C.

Discovery of a plant with only the female or seed-forming parts functional is always important to breeders, for it eliminates the tedious task of plucking off the stamens by hand that is necessary with normal-flowered plants before production of new hybrid strains can be attempted.

Male-sterile plants previously reported have included tomato, flax, onion, sorghum, barley and sugar-beet.

Science News Letter, January 3, 1948

ELECTRONICS

Television Transmission To Moon and Back Planned

➤ AN ambitious French scientist is now planning to send television images to the moon and back. He is inspired by the success of American radar experts in reaching the moon with their powerful transmitters and is reported to be now negotiating for the use of the same instruments.

The scientist is M. Edouard Belin who has already achieved much in long-distance television transmission. His plans were revealed by the French Embassy information service. The desire to use an American transmitter is because none powerful enough exists in France.

M. Belin expects to use what he designates as a "square" method. The image would first be transmitted from Paris to America, then by a powerful American instrument to the moon. The moon would receive the image and send it back, perhaps to a station in northern India, from which it would be relayed to Paris. The image would have travelled some 480,000 miles.

Science News Letter, January 3, 1948



MEDICINE

Two Marines Get Leprosy Through Being Tattooed

➤ THE cases of two U. S. Marines who got leprosy through being tattooed are cited by the *Journal of the American Medical Association* (Dec. 27) as providing "strong evidence" that leprosy can be spread by inoculation.

The Marines were tattooed at Melbourne, Australia, by the same man on the same day. Both developed leprosy in the tattoos three years later, Drs. R. J. Porritt and R. E. Olsen report. The diagnoses of leprosy were made by the U. S. Public Health Service at its Marine Hospital at Carville, La., the national leprosarium.

Both the Marines and the tattooer were "inebriated," the medical report states, and a number of needles were broken during the tattooing. One of the Marines had a number of tattoos on his left arm but leprosy developed only in the tattoo made in Melbourne on the day his friend was tattooed.

The possibility of leprosy being spread by a needle is borne out by other cases reported in the past, the medical journal points out. One such case was that of a man who was assisting at an operation on a leper and got his finger pricked. Leprosy developed after several years. Another case was one in which leprosy developed in a man repeatedly injected with blood from a leper. Leprous skin sores developed in less than two months after the first inoculation.

Cases in which leprosy has not occurred following attempts to produce it by inoculation have also been reported, and have made this method of the spread of leprosy a matter for debate in the past.

Science News Letter, January 3, 1948

PHYSICS

Gigator Is New Name Proposed for Atom Smasher

➤ IF you begin to hear about a gigator, don't reach for your animal book. The gigator is no relation to the alligator.

The gigator, thus far, is just a proposal—for a powerful new atom-smasher. It was suggested recently by a Swiss physi-

cist, Rolf Wideroe, in a communication to the American journal, the *Physical Review* (Nov. 15).

The name gigator, comes from the term gigavolt, a billion volts. Mr. Wideroe, of Brown, Boveri and Company, Baden, Switzerland, explains that the newly-suggested atom-smasher would be a circular accelerator for heavy particles. At certain voltages, he believes the gigator would be better than the synchro-cyclotrons which several American atomic science centers either have in operation or under construction.

Science News Letter, January 3, 1948

AGRICULTURE

Raw Potatoes Replace Corn In Fattening Steers

➤ POTATOES can be used instead of grain for fattening cattle, experiments on the stock farm of Eugene K. Denton at Flanders, N. J., have demonstrated. Twenty yearling steers gained an average of 25 pounds each in a 25-day feeding period on a ration of 50 pounds of potatoes each per day. This replaced a daily feeding of 16 pounds of corn per day, and resulted in a total saving of four tons of corn for the whole feeding period.

Science News Letter, January 3, 1948

GENERAL SCIENCE

Science Talent Search Winners Hold Reunions

➤ YOUNG scientists from as far away as Korea gathered in Chicago, New York City and San Francisco on Dec. 26 for the regular Christmas reunions of winners in the Annual Science Talent Searches.

Frederic Petersen expected to arrive by Army transport in time to attend the one in San Francisco. T/5 Petersen, whose home is in Minden, Nebr., has spent several months with an isolated group of 96 Koreans whom he has trained as a fire fighting team. His talk of science has been limited to interpreters and sign language.

Approximately 60 of the 240 winners chosen in the last six Searches planned to attend one of the three unions.

The young scientists, all under 24 years of age, are attending 29 colleges and universities where they are specializing in sciences ranging from atomic physics to zoology. Twelve states and the District of Columbia were represented.

Science News Letter, January 3, 1948

GENERAL SCIENCE—AAAS

Young Scientists Tell How They Got Started

➤ THE youngest scientists attending the midwinter meeting of the American Association for the Advancement of Science in Chicago—in age from 17 to 24, in academic standing from high-school student to doctoral candidate—held their own special Junior Scientists' Assembly, to tell each other and assembled members of the AAAS and National Science Teachers Association how boys and girls first set their feet on the long trail of research.

Fifteen young scientists took part in the discussion, which was conducted under the chairmanship of Paul Teschan, Shorewood, Wis., first boy winner of the Westinghouse Grand Science Scholarship of \$2,400 in the initial Science Talent Search conducted by Science Service in 1942. Mr. Teschan is now in the graduate medical school of the University of Minnesota. Eight of the other participants were also winners in the annual Science Talent Search, four are winners of the American Association for the Advancement of Science honorary junior membership awards, and three have been given honorary junior memberships in their respective State Academies of Science.

One of the two young women participating, Miss Evelyn Pease, Evansville, Ind., told of the difficult reactions she carries through as part of the work in organic syntheses in which she was launched as part of the war effort. Some of her work was on a series of new sulfa drugs.

Carl Stapel, Appleton, Wis., told of his scientific evolution from a boy fascinated with a motor-operated erector set to his present interest in some of the more advanced work in radio, especially narrow-beam frequency modulation. Projects now before him include frequency-modulating a beam of light, developing a light-operated radar set and putting a sound-operated radar set into use.

The phenomenon of thermophosphorescence has attracted Alfred T. Peaslee, Jr. This is the peculiar property of some substances, for example common salt, of shining with visible light when bombarded with X-rays. He split the light up into its spectrum, and measured the intensity of each wavelength band. He has plans for extending his research with other materials, using specially designed spectrographs.

Science News Letter, January 3, 1948

GENERAL SCIENCE

Science Previews for 1948

A billion years of space will be probed by the Mt. Palomar telescope; range of V-2 rockets may be doubled; attempts to control weather may be more successful.

By WATSON DAVIS

► HERE are sure things and long shots for science in the new year or in the years to come.

In 1948, good bets include:

1. The giant 200-inch telescope, world's largest, on Mt. Palomar, Calif., will go into service, reaching a billion years into the unprobed depths of space. While new close-up views of the moon, Mars and other planets will be obtained, greatest astronomical interest will be in the photographs of the spectra of distant stars in remote galaxies. They will tell whether the unsampled remote regions of the universe are like the part we live in.

Ancient Remains Sought

2. New discoveries of the remains of ancient man, especially in Africa and North America, will be sought, attempting to push back the antiquity of man in the western hemisphere to 30,000 to 40,000 years ago.

3. Flights of new jet planes and further development of guided missiles will be made, some of which will be kept secret for military reasons. Range of V-2 rocket may be doubled to beyond 200 miles.

4. Attempts will be continued to control weather and make rain by sprinkling clouds from airplanes, or new techniques, possibly with some practical successes.

5. People will see in the night sky a fairly bright object, Bester's Comet. It should be second or third magnitude (as bright as many well-known stars) along about March.

6. Airplanes will be fitted with CAA-developed crosswind landing gear, raising possibility of using single-runway landing fields for all types of planes, reducing airport size and allowing ports closer to cities.

7. New fundamental knowledge in biology and medicine of immediate practical importance will be discovered through use of radioisotopes from atomic pile.

8. Superconductivity, the extraordinary

loss of electrical resistance at certain low temperatures by certain substances, will be further explored and possibly applied practically.

9. Beginning of construction of a gigantic billion-electron-volt atom smasher may take place, which should eventually duplicate cosmic radiation and bring about transmutations, nuclear rearrangements and possibly release of atomic energy by new mechanisms.

10. Attempt may be made to send a small rocket to the moon its arrival to be signaled to earth by a flash on the moon's surface.

These are just ten top possibilities of scientific achievement likely to climax in 1948. Some things that scientists are working on are more important but their future time-table is less definite. For instance:

Discovery of the secret of photosynthesis, how the green leaf converts sunshine into food and energy, may be possible in the future through research now in progress. If a photosynthesis process of even low efficiency were practical on an industrial scale, it would be more important than the peacetime use of atomic energy. It would be the major industrial advance of the century.

Cancer Cure a Hope

The discovery of the cause and cure of cancer (or at least the most prevalent kinds of the many varieties of cancer) is another great research objective, eventually to be achieved, but not really expected within the coming year.

Many diseases and potential epidemics need conquering through research, despite the great advances made in the last two decades. The world health picture is clouded for the future by our fear that in some places on the face of the earth scientists are working to create new and more deadly diseases to be used as weapons of war.

Failure to achieve international control of atomic energy and biological (germ) warfare under the United Nations places a large question mark before the future of civilization, including the progress of science.

Will the "cold war" now being waged, the chaos in many parts of the world, and eventually a fighting war, neutralize real scientific progress? War or conflict of any sort stops new fundamental research out of which the practical applications of the future must come. Applied military research now being accelerated in the United States, the U. S. S. R. and elsewhere is done largely at the expense of fundamental research.

Except for military research and development, science in the United States is still without major governmental support through a National Science Foundation. It may possibly be authorized by Congressional and Presidential action in the coming year.

On the international science scene, some progress in world cooperation is being made by UNESCO and the various international science unions. Look for some steps toward an international observatory where astronomers of various nationalities will be able to work together under United Nations auspices.

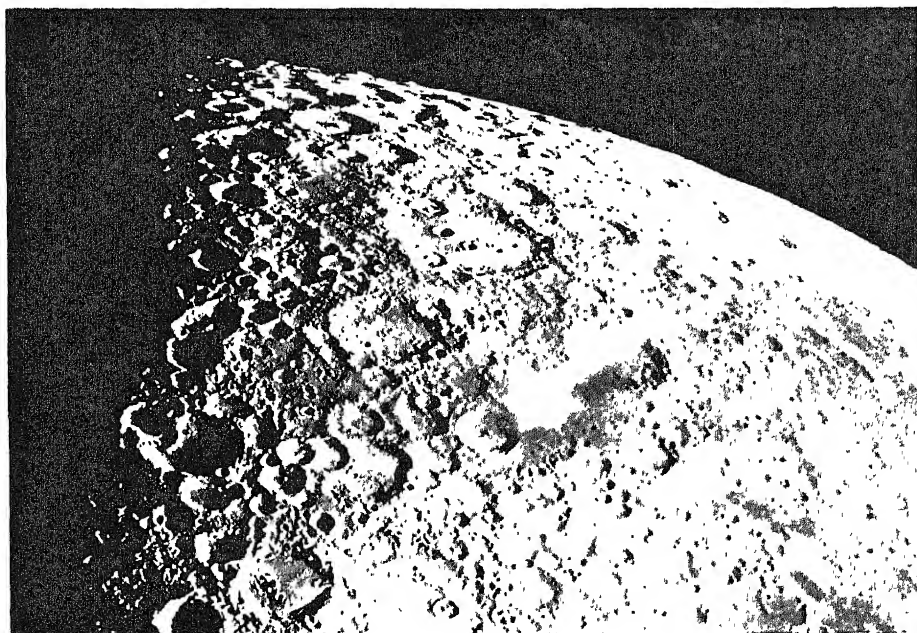
More Interchange

More interchange of scientific information and more travel of scientists in various countries will be stimulated by UNESCO and other international agencies. The Fulbright act that allows Americans to study and conduct scientific work out of proceeds of the sales of war surpluses abroad will provide means of travel and research abroad.

The acute world food situation will call for the cooperation and talents of scientists throughout the world, particularly on agricultural production. The foot-and-mouth disease invasion of Mexico will continue to be a major problem and a menace to the livestock industry of the western hemisphere.

Expect to hear about some more new insecticides for special uses and greater application of the older ones, such as DDT, developed during the past few years. More cities will join in the summer of 1948 the list of those communities that were made virtually flyless by clean-up campaigns and DDT spraying. There should be a nationwide campaign to eliminate the menace of poison ivy now that ways of eradicating it are known.

You will hear more about methods of farming that are useful in special situ-



SHOOTING AT THE MOON—An artist's conception of a rocket striking the moon, a possible achievement in the coming year, was made on a photograph taken by the 100-inch telescope at Mount Wilson Observatory. New close-up views of the moon will be made in 1948 with the 200-inch Mount Palomar telescope.

ations, such as killing weeds by flaming them or treating them with 2,4-D chemical.

Under the U. S. Atomic Energy Commission, several high-powered research centers are getting underway. It will take many months for them to begin producing on a large scale, but the long time benefits will be great and some immediate results can be expected in 1948. Brookhaven on Long Island, N. Y., Argonne near Chicago, and Oak Ridge in Tennessee, are the principal laboratories devoted to general exploration of the results of atomic fission, as well as those that have military applications. Add to these the outstanding Radiation Laboratory at Berkeley, Calif., General Electric's atomic laboratory near Schenectady, N. Y., and dozens of projects in university and industrial labora-

tories and you have a full-blown attack upon the secrets of the atomic nucleus in all its ramifications.

Mental illness continues to be a great economic and social loss as well as personal disaster. Group psychotherapy is likely to grow in favor in the coming months and the general practitioner will be found to take a greater interest in the psychological aspects of medicine. Electric shock therapy is likely to be used less in the treatment of mental disorders.

Television broadcasting will continue to grow slowly, dependent upon the operation of radio relays and co-axial cables between cities as well as the sale of receivers. The New York to Boston radio relay for high frequency and frequency modulation will go into operation regularly.

Science News Letter, January 3, 1948

GENERAL SCIENCE

'47 Predictions Come True

➤ YOU had advance information on what would happen in science when a year ago you read the Science Service forecast for 1947. (See *SNL*, Jan. 4, 1947.)

In aviation, for instance, it was pre-

dicted that instrument push-button landings would come into use and the round-trip across the Atlantic was one of the past year's major flights.

The first jet-propelled transport took to the air, as foretold.

The CAA ordered radar installed in some transport planes as an anti-collision device. Availability of such radar commercially was forecast.

Doubt was expressed as to whether the National Science Foundation would be created. Congress and the President were unable to agree on how it should be operated and it is still unfinished national business.

The solar eclipse in May was observed by extensive expeditions. This was a sure thing, of course.

The great 200-inch telescope did not actually go into service, as hopefully predicted, but its mirror did make the journey to the top of Mt. Palomar.

Some new and useful insecticides were made known as foreseen.

Soilless gardens in Japan did begin providing our occupation forces with fresh vegetables.

The U. S. Atomic Energy Commission got its peacetime development and research program underway.

Some of the admittedly long shots predicted for 1947 did not come through, but are still future possibilities:

Discovery of the secret of photosynthesis.

Control and prevention of some kinds of cancer.

Discovery of a new chemical element.

Operation of an atomic energy plant.

Science News Letter, January 3, 1948

PHOTOGRAPHY

New Full Color Process For Movies Announced

➤ PRINTING motion pictures in full color, by a new process revealed by Polaroid Corporation, of Cambridge, Mass., produces three separate color images on a single layer of standard black-and-white film from three color separation negatives.

The new process is known as Polacolor. Use of this standard film and essentially the same processing equipment employed in black-and-white movies makes the process relatively inexpensive. The new full-color movies are suitable for showing in standard projectors.

Printing the three color images is effected by conventional devices. All the film materials, chemicals and processing agents are available commercially. The Polacolor silver sound track is exposed and developed along conventional lines and has the same characteristics as conventional sound tracks for black-and-white moving pictures.

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ASTRONOMY—AAAS

Origin of Meteorites

All are shattered fragments from ancient planet smaller than earth that once moved in an orbit between those of Mars and Jupiter.

➤ METEORITES, those chunks of iron and stone that occasionally rush flaming down through the atmosphere and make crash landings on the earth, are all shattered fragments of an ancient planet that once revolved around the sun, Dr. Carl August Bauer, of the University of Michigan, told the section on astronomy of the American Association for the Advancement of Science.

The planet was smaller than the earth. It moved in an orbit between those of Mars and Jupiter, where the asteroids or minor planets are to be found today.

The speaker fitted the various types of stony and metallic meteorites that have been collected and studied into a picture of a planet considerably smaller than the earth but built essentially in the same way. Specifications call for a metallic core of iron and nickel, with the nickel most concentrated towards the center but present in some proportion throughout. Outside of this was a stony shell, again with metal admixtures most abundant in its deeper part, grading down to practically nothing in a thin outer layer corresponding to the stony crust of the earth.

This theory of the ancient planet is made plausible by Dr. Bauer's studies indicating that meteorites may have been "artificially aged" by cosmic-ray bombardment in outer space, very much as whisky is sometimes hurried through the aging process by ultraviolet irradiation. Thus they are not always as old as they seem.

Heretofore, age of meteorites has been

estimated largely on the basis of the small quantities of helium they contain, just as terrestrial rocks are judged. This is because the "orthodox" way for helium to originate is through the slow decay of uranium. This is all very well for earthly rocks, especially for those from well-buried sites; but it has now been shown that helium can also be produced by the impact of cosmic rays on various elements.

PSYCHOLOGY—AAAS

First-Born More Selfish

➤ THE oldest child in the family tends to be more jealous, more selfish—and neater. The younger brother or sister is likely to be happier, more generous—and more punished.

This effect of place in the family on personality was reported by Profs. W. Allison Davis and Robert J. Havighurst, of the University of Chicago. It applies, they found, to both colored and white families of the middle economic class.

Negro and white middle-class families are very much alike, they observed. They have the same number of children, are about the same age when they marry, and bring up their children in much the same way.

But the differences found are interesting. Negroes are more easy-going about feeding their babies whenever they want to nurse and they wean them later than do the white mothers. On the other hand, Negro mothers are more strict about toilet training.

Negro mothers give their girls more responsibility in the home but do not let them go to the movies as young as do the white mothers, it was found.

Intelligence tests are unfair to poor children, the same scientists told the meeting. Rich children, they say, have the advantage on three counts: they are more familiar with the situations described in the class of "scholastic" problem used, the words used are more common among wealthy people, and finally rich children are more likely to have a

This "artificial aging" of meteorites, occurring irregularly, may very well be responsible for the great apparent differences in age among meteorites that have been analyzed, Dr. Bauer suggested. This explanation overcomes the principal objection to the otherwise quite plausible theory that these meteorites are the shattered fragments of an ancient planet.

What tore this ancient planet apart and scattered its pieces throughout a wide zone of planetary space is not even guessed at as yet. But although the fragments of that long-perished planet may not be as old as formerly assumed, they are by no means things of yesterday; for Dr. Bauer assigned to them an antiquity of "several hundred million years."

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motive to work hard to solve an academic problem.

Reading is a serious handicap to the poor children, they found in an experiment with 516 school children. But the poorest children improve more than the richest children when the situations and words of the problems are chosen from among those more generally common in the United States.

Science News Letter, January 3, 1948

GENERAL SCIENCE

Old Italian Library Asks Aid To Rebuild Collection

➤ A FAMED Italian cultural center, the Ambrosiana Library and Art Gallery of Milan, has issued an international appeal for books and periodicals with which to rebuild its war-damaged scientific collection.

Already, 35 nations are represented in the contributions, but officials of the Ambrosiana are particularly anxious to receive more material from the United States. Scientific publications may be sent to Erminio Turcott, an Italian civil engineer who is working on the restoration of the scientific library of the Ambrosiana.

Science News Letter, January 3, 1948

Ergot in grain causes ergotism in man; ergot is an important disease of rye, wheat, barley and many grasses which sometimes passes to humans eating the grain.

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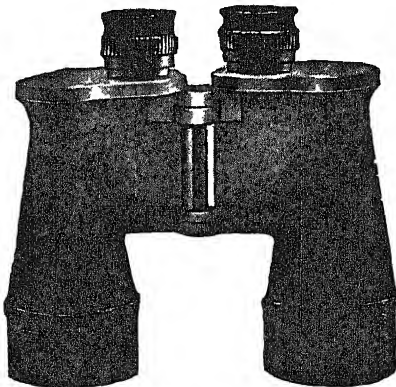
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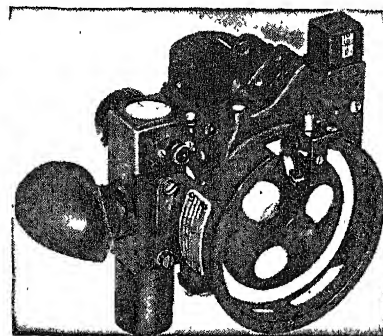
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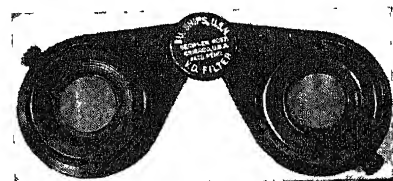
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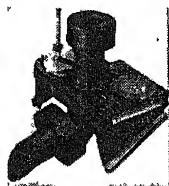
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➤ SNOWS have fallen on the earth during millions of winters—millions upon millions of tiny frozen six-pointed stars in each storm. Human imagination simply balks at the job of calculating how many snow crystals there have been during the planet's long history. Yet, scientists assure us, no two of them have ever been exactly alike.

This declaration, to be sure, is based on a very small sampling. Only a few thousands of snow crystals have ever been actually photographed through a microscope. But it is true that among these thousands of permanent and detailed records no duplicates exist.

It is fascinating to go through the pictured pages of the classic book on snow crystals by Bentley and Humphreys, with its pages upon pages of magnificent snow photomicrographs,

comparing one picture with another. Sometimes you think you almost have twin portraits—but “almost” is as close as you ever get. Always some little detail in size, or lacy sculpturing, or delicate surface marking defeats the search for absolute identity.

It should be possible now to put this no-duplicates dictum to the test, since scientists have shown us how to produce snow crystals at will, and under controlled laboratory conditions, by dry-ice “seeding” of masses of super-cooled water vapor. By using the same degrees of dampness and cold, and the same quantities of dry-ice powder of uniform particle size, it should be possible to

produce quantities of snow crystals of the same general types at least, and perhaps approaching identity in shapes and patterns even if not quite attaining it.

Probably the best chance of finding twins among snow crystals would be found under conditions simulating the deep cold and low atmospheric pressure of the upper snow-forming levels of the air. Natural snow crystals from these severe upper reaches have a Doric simplicity of outline and patterning, as compared with the Rococo filigree-work of the branched and re-branched stars that form in the denser, less cold clouds that form low ceilings on gray winter days.

Science News Letter, January 3, 1948

METEOROLOGY

Snow and Blizzards Made

Climatic chamber of Army Signal Corps, as large as four-room house, has temperatures at 40 degrees below zero and continuous artificial snow.

See Front Cover

➤ ACTUAL snow on a continuous basis is being made by man in climatic test chambers of the Army Signal Corps at Fort Monmouth. It is made in sufficient quantities to test military equipment under simulated Arctic conditions, and is believed to be the first accomplishment of its kind on record.

By the use of blowers, made-to-order blizzards are developed. The climatic test chamber used is as large as a four-room house and can hold a truck and trailer. Temperatures can be maintained at 40 degrees below zero Fahrenheit by a giant refrigerator plant. One of these chambers is shown on the cover of this week's SCIENCE NEWS LETTER.

A careful pre-conditioning of the test room precedes the manufacture of snow. This period is of sufficient length to remove much of the heat stored in the inside air and the building itself. Steam at high temperatures is then injected into the room to create an atmosphere saturated with moisture and containing water vapor in suspension. This forms a visible cloud or fog.

This cloud rapidly cools to a temperature below the freezing point of water to form what is called a super-cooled cloud. Dry ice does the rest. When the super-cooled cloud is at a temperature under 10 degrees above zero, a small bag of dry ice, about the size of a finger

tip, is shaken in it. When the cloud reaches a temperature near minus 40, the water vapor crystallizes, forming literally billions of microscopic snow crystals. These unite to form snowflakes that fall to the floor and blanket it.

Science News Letter, January 3, 1948

MEDICINE

Tonsil Removal Doesn't Predispose to Polio

➤ A tonsil operation does not appear to predispose a child to poliomyelitis, a study at the University of California Medical School indicates.

Dr. Paul M. Pederson, aided by Drs. E. B. Shaw and A. Palermo, said their study of 492 cases hospitalized between 1941 and 1945 in the County Hospital and the Children's Hospital at San Francisco indicated no material difference in the ratio of polio to recent tonsillectomy and the incidence of polio in the general population.

Dr. Pederson found, in the 34 counties from which the patients came, that there had been a total of 2,057 cases of polio and 57,796 known tonsillectomies in the same period of study.

The incidence of poliomyelitis to general population in the epidemic year 1943, for example, was one to 1,960, while the incidence of polio following tonsillectomy for the same year was one to 1,782, or five cases in 8,910.

Science News Letter, January 3, 1948

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THE AMERICAN COLLEGE DICTIONARY—Clarence L. Barnhart, ed.—*Random House*, 1432 p., \$5.00. This up-to-date compendium includes correct definitions for many new scientific terms.

AMERICAN MEDICAL RESEARCH: Past and Present—Richard H. Shryock—*Commonwealth Fund*, 350 p., \$2.50. Historical survey of the development and achievements of medical research in the United States, references to popularization of medicine, particularly by Science Service, need elaboration and correction.

AMERICA'S DESTINY—Herman Finer—*Macmillan*, 408 p., \$5.00. The author contends that it is America's destiny to assume the position of world leadership formerly occupied by England, and to enforce peace and democratic rights in the world.

BROKEN HOMES—George Thorman—*Public Affairs Comm.*, Pamphlet No. 135, 30 p., illus., 20 cents. An analysis of the causes and effects of the break-up of family life—by death, divorce, desertion, or involuntary separations.

CHILDREN IN THE COMMUNITY—Sybil A. Stone, Elsa Castendyck, and Harold B. Hanson—U. S. Children's Bureau Publication No. 317—*Govt. Printing*, 182 p., 35 cents.

DOUGLAS OF THE FIR—Athelstan George Harvey—*Harvard Univ.*, 290 p., illus., \$4.00. An interestingly written account of the life and travels of this famous explorer and horticulturist.

EASTERN ALGONKIAN BLOCK-STAMP DECORATION: A New World Original or an Acculturated Art—Frank G. Speck—*Archaeological Soc. of N. J.*, Research Series No. 1, 62 p., illus., \$2.00.

FEDERAL DUCK STAMPS AND THEIR PLACE IN WATERFOWL CONSERVATION—Edna N. Sater—*Govt. Printing*, No. 3, Fish and Wildlife Service, Department of the Interior, 14 p., 15 cents.

FOOD, NUTRITION AND HEALTH—E. V. McCollum and J. Ernestine Becker—*Published by the authors at Johns Hopkins Univ.*—146 p., \$2.00. For the layman, a concise guide to the science of nutrition.

HANDBOOK OF GEM IDENTIFICATION—Richard T. Liddicoat, Jr.—*Gemological Inst. of Am.*, 283 p., illus., \$4.50. Jewelers, gemologists and students will find useful this manual, which includes a comprehensive index as well as a glossary of the usual gemological terms.

HELPING CHILDREN IN TROUBLE—U. S. Children's Bureau, Federal Security Agency, Publication 320—1947—*Govt. Printing*, 17 p., illus., 10 cents.

HERITAGE OF FREEDOM—Frank Monaghan—*Princeton Univ.*, 150 p., illus., \$3.50. Published in cooperation with the American Heritage Foundation, this account of the historical significance of each of the documents exhibited on the Freedom Train includes facsimile reproductions of about 30 principal testaments to our freedom.

THE INDUSTRIAL STUDY OF ECONOMIC PROGRESS—Hiram S. Davis—*Univ. of Pa.*, Research Studies XXXIII, 187 p., \$2.75. The Director of the Industrial Research Department, Wharton School of Finance and Commerce, presents basic concepts and methods of applying the industrial approach to the study of economic progress.

THE LOGIC OF THE SCIENCES AND THE HUMANITIES—F. S. C. Northrop—*Macmillan*, 402 p., \$4.50. Explorations into the applications of deductive, inductive, and institutional logic in the varied scientific methods of the natural and social sciences and the humanities.

MEASUREMENT OF CONSUMER INTEREST—C. West Churchman, Russell L. Ackoff, and Murray Wax—*Univ. of Pa.*—214 p., \$3.50. This book is the result of a conference on experimental method in consumer analysis, sponsored by the University of Pennsylvania in May, 1946.

MICROSCOPIC ANATOMY OF VERTEBRATES—James I. Kendall—*Lea and Febiger*, 3rd ed., 354 p., illus., \$6.00. A text intended to supply a working knowledge, supplementary to courses in comparative anatomy and embryology as a foundation for physiology and graduate work.

THE PENNSYLVANIA RAILROAD: A Pictorial History—Edwin P. Alexander—*Norton*, 248 p., illus., \$6.00. A copiously illustrated account of one of the greatest transportation systems in the United States.

ROCKET SHIP GALILEO—Robert A. Heinlein—*Scribner*, 212 p., illus., \$2.00. The author's conception of the first piloted rocket ship flight to the moon, for boys.

THE SCIENTIFIC PAPER: How to Prepare It, How to Write It—Sam F. Trelease—*Williams and Wilkins*, 152 p., \$2.00. Designed to aid scientists and students in the preparation of technical papers and theses, this revised edition of "The Preparation of Scientific and Technical Papers" is compact yet comprehensive.

SOVIET EDUCATION—Maurice J. Shore—*Philosophical Lib.*, 346 p., \$4.75. History and analysis of the principles of Marxian planned education, geared to the life process within which they operate.

TECHNIQUE OF HOUSE NAILING—Housing and Home Finance Agency—*Govt. Printing*, 53 p., illus., 20 cents.

TREE-RING HYDROLOGY IN SOUTHERN CALIFORNIA—Edmund Schulman—*Univ. of Ariz.*, Laboratory of Tree-Ring Research Bulletin No. 4, Vol. XVIII, No. 3, 36 p., 35 cents.

TRENDS IN OUTPUT AND EMPLOYMENT—George J. Stigler—*Nat'l. Bur. of Econ. Res.*, 25th anniversary series, 67 p., \$1.00.

THE WORLD WITHIN—Mary Louise Aswell, ed., with introduction and notes by Fredric Wertham—*Whitlsey House*, 376 p., \$3.75. Fifteen chapters from famous fiction, illustrative of the neuroses of modern life, with notes on the literary merit and scientific accuracy of each selection.

YOUR PLANS FOR THE FUTURE—Mary Ford Detjen and Ervin W. Detjen—*Whitlsey House*, 294 p., illus., \$2.50. For young people, a timely and interesting discussion of the diverse problems of correlating education to career choices.

Science News Letter, January 3, 1948

GEODESY

Chaff that Baffled Radar Now Helps Army Mapping

➤ CHAFF, the aluminum foil used by U. S. military forces to baffle enemy radar warning systems, is being utilized now in a new and novel manner by U. S. Army engineers working from the headquarters of the Caribbean Command at Quarry Heights, C. Z.

In a plan developed by Col. Fremont Tandy and Capt. William Hatcher, the aluminum foil, which resembles Christmas-tree tinsel, is dropped from airplanes to mark designated high spots in the jungles of Panama. This facilitates the mapping of that entire country, now being carried on by the U. S. Army Engineers working in ground survey parties proceeding through the jungle on foot.

Formerly, to obtain geodetic information, the survey parties with their heavy equipment had to climb all the peaks in each locality to determine the highest summit. Now, an airplane flies overhead, determining the highest point among several with its nontarnishable chaff on the loftiest peak, from where it is visible for several miles. Days of wearisome climbing are saved.

It is predicted that this inexpensive marking device may become a standard mapping procedure in jungle areas throughout the world when its efficiency has become established.

Science News Letter, January 3, 1948

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⚙️ **CAP-CATCHING HOUSING** for the familiar bottle opener is a plastic casing with a recess within which the cap-remover is fixed. When the neck of the bottle is inserted and the cap removed in the ordinary manner, the cap drops into the box-like bottom instead of on the floor.

Science News Letter, January 3, 1948

⚙️ **FIBERGLAS** acoustical tiles for room ceilings and sidewalls are noncombustible and have high sound-absorbing properties. Painted white at the factory, the one-foot-square light-weight tiles can be cemented to a solid backing or held in place by wood or metal furring strips.

Science News Letter, January 3, 1948

⚙️ **ADJUSTABLE RADIUS CHAIR** swings on a circle of two-foot radius to permit the worker to use two or more desks. The chair itself is on the end of a horizontal arm which can be slid back and forth through a pivot top to a solid metal base which is bolted to the floor.

Science News Letter, January 3, 1948

⚙️ **BELT**, for transmitting power in various types of machines, has rubber teeth that fit into grooved pulley wheels designed for use with it. It is made of steel cables embedded in synthetic rubber, is highly flexible, almost noiseless in action, and permits no slippage.

Science News Letter, January 3, 1948



⚙️ **PAINT BRUSH CONTAINER**, shown in the picture, is an airtight and liquid-tight plastic bag in which brushes may be stored with or without cleaning. The oil in the residue paint itself keeps the bristles soft and pliable if the elastic band on the top is properly tightened.

Science News Letter, January 3, 1948

⚙️ **RUBBER LUNG**, for artificial respiration to victims of drowning and electric shocks, is built around a large rubber bellows with an electric pump to force air in and out, simulating breathing.

Light in weight in comparison with the ordinary steel lung, it can be easily carried and folded for storage.

Science News Letter, January 3, 1948

⚙️ **PIPE CUTTER** has a push-button release and lock which enables an operator to adjust the tool instantly on pipes from one-quarter inch to two inches in size. The pull-open, push-close action is a work-time saver, and an exclusive fol-lower wheel assures fast, true work.

Science News Letter, January 3, 1948

⚙️ **BUTTER CONDITIONER**, built into the wall of a new electric refrigerator, keeps the butter in safe condition but soft enough to be easily spread. The conditioner compartment holds one pound of butter at a time.

Science News Letter, January 3, 1948

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Question Box

ASTRONOMY

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Photographs: Cover, p. 14, U. S. Army Signal Corps; p. 3, U. S. Navy; p. 5, National Bureau of Standards.

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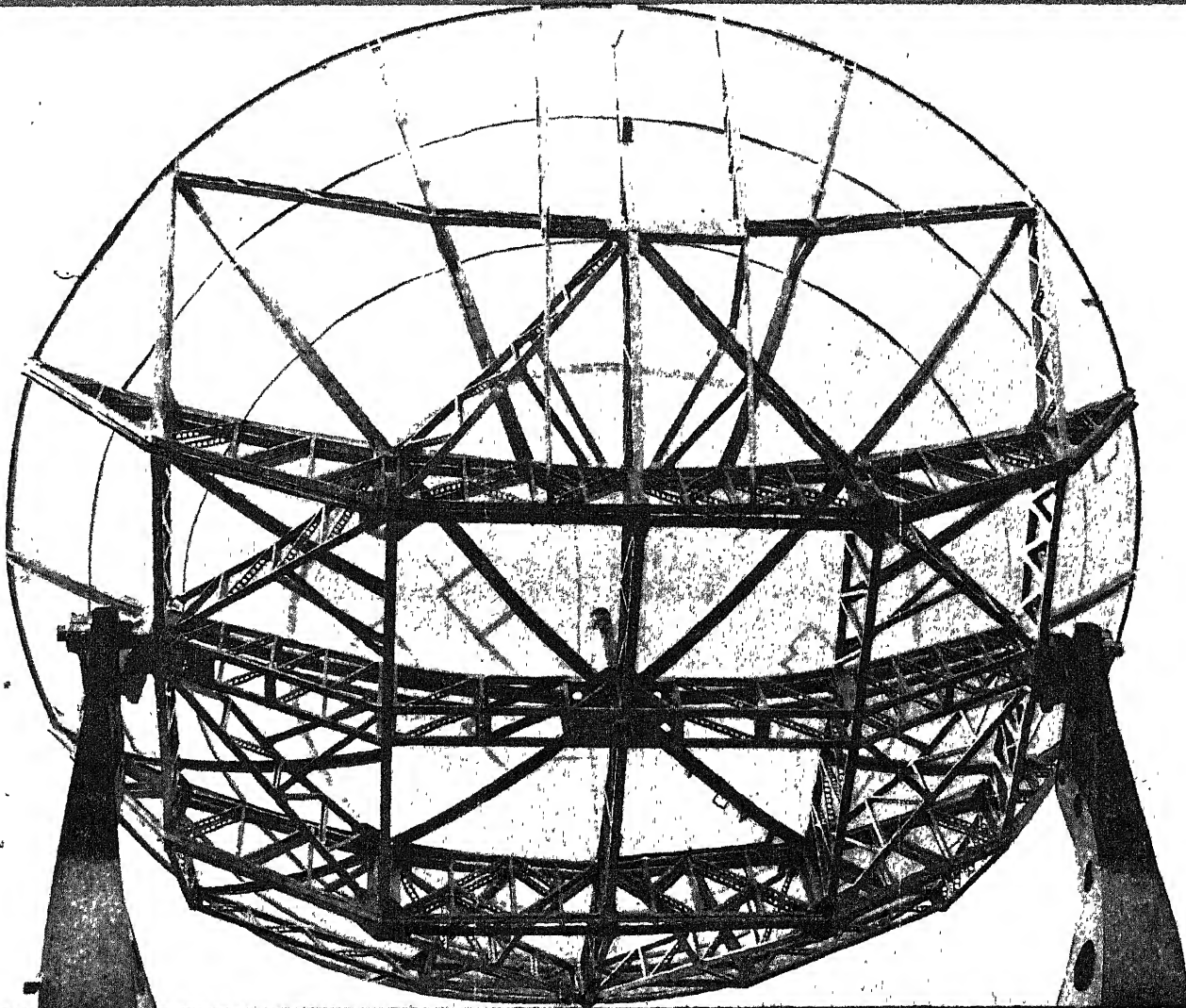
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Vol. 53, No. 2

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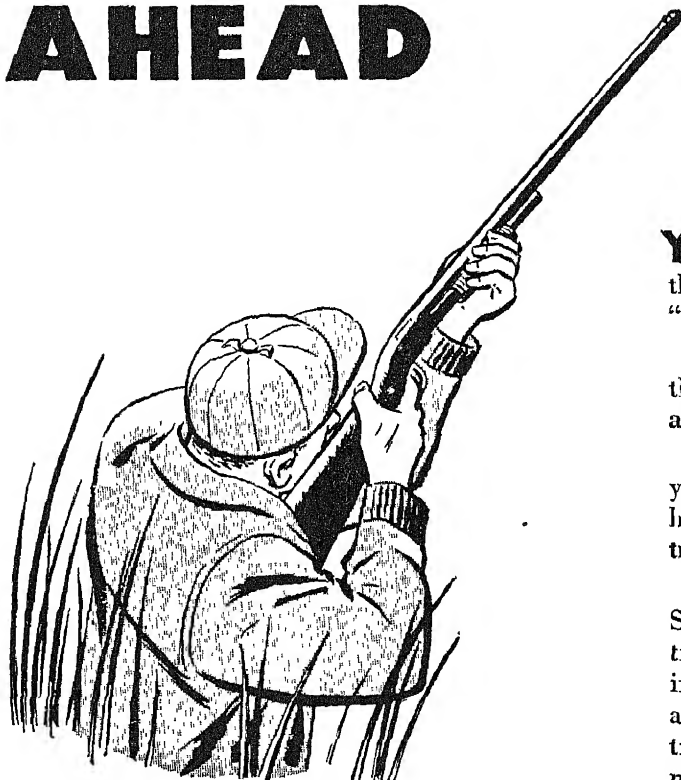


Radar Mirror

See Page 25

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BOTANY-AAAS

First Photosynthesis Step

Mysterious "Factor B", first material made by plants using sunlight, may hold the key to the artificial manufacture of food in the future.

► THE discovery of the first material that is manufactured by the living plant through the energy of the sunlight has been made.

This may be to the artificial manufacture of food of the future what discovery of the fission of uranium was to the atomic bomb.

A scientific team from the University of Chicago, Drs. Hans Gaffron, A. H. Brown and E. W. Fager, has determined just what is the primary product that is made out of carbon dioxide and water, energized by the light acting through chlorophyll, the green stuff of the plant.

It is a mysterious "Factor B," unidentifiable as any known chemical. Hidden in the composition of this unknown substance may be the key to duplicating the year round in factories what the farms and forests of the world work at only in the summer growing season.

Promising Development

Scientists of the American Association for the Advancement of Science, who spent two days on discussions of photosynthesis, as this process of sugar and starch manufacture in the living plant is called, rate this factor B as the most promising development so far made.

Tagged atoms of carbon, a byproduct of atomic bomb research, were used to track down just what is made out of the carbon dioxide, one of the waste gases of the air that every animal breathes out. In the experiments, a slimy green alga named *scenedesmus* was put in contact with carbon dioxide, all of the carbon atoms of which were artificially radioactive "carbon 14." Wherever this isotope or variety of carbon travels can be told by the clicks that its exploding atoms cause in a Geiger counter. The carbon dioxide raw material can be traced to any part of the growing plant by this method.

The Chicago scientists found that it takes only a very few seconds for the green algae to snatch up some of the tagged carbon dioxide and convert it by means of the light energy into the new mysterious factor B.

They used hundreds of quarts of the algae in getting enough of this first product of photosynthesis to analyze in various ways. All manner of tests failed to identify it. They know it is not sugar starch, a protein-like substance or the common organic acids. The one thing they do know is that it acts more like an acid than anything else, although it is much less active than most such substances.

Used by Plant for Building

The plant uses factor B material with great rapidity and ease to build up the many complex parts of the living plant. This is shown in other experiments by the speedy spread of the tagged carbon atoms to all parts of the plant.

The search for the secret of photosynthesis is getting hotter. Large vats of the convenient green algae are being grown at the University of Chicago to give more material on which to experiment.

At the University of California, radioactive carbon is being used in working with another simple green plant, the alga called *chlorella*. At Antioch College in Ohio, scientists are trying to discover the way chlorophyll is put together chemically, which may lead to reproducing or bettering the substance that captures light energy and puts it to work.

Scientists do not dare guess how long it will be before an artificial green plant can be built or whether a chemical process can be achieved to convert sunshine economically into sugar and starch for food or factory material. But that is the practical goal for these tedious experiments with the simplest of growing plants.

Upon these researches may depend whether the world continues to be hungry as future decades bring hundreds of millions more people to the earth. The scientists doing the work, unlike those who made the atomic bomb, have easy consciences as to what the future will bring forth. For they do not see how their discoveries can be fashioned into weapons for destruction.

Science News Letter, January 10, 1948

Stories from the meeting in Chicago of the American Association for the Advancement of Science are designated by AAAS in the line above the head. For other reports from the conference see SNL, Jan. 3.

GENERAL SCIENCE-AAAS

AAAS Prize Awarded for Paper on Earth's Origin

► THE thousand-dollar prize of the American Association for the Advancement of Science was awarded to 30-year-old Dr. Harrison S. Brown, of the University of Chicago's Institute for Nuclear Studies, for his paper on elements in meteorites and the earth's origin. Dr. Brown is the youngest scientist ever to receive this prize, which was given for the 21st time at the meeting in Chicago.

The research which was the subject of Dr. Brown's prize-winning paper is expected to become the basis of further studies which may lead to a closer estimate of the age of the earth and of the known universe. Since the age of the cosmos is now variously estimated at from three to ten billion years there is plenty of room for closing the bracket.

Interviewed after receiving the prize, Dr. Brown mentioned that one of his colleagues has recently succeeded in isolating a few milligrams of lead from an iron meteorite. Since lead is the final



PRESIDENT-ELECT — Dr. Elvin Charles Stakman of University Farm, St. Paul, Minn., will head the AAAS in 1949.

stage in the radioactive decay of uranium, this accomplishment should materially aid in the determination of the age of meteorites, and hence of other material in the universe, as soon as the uranium content of the original sample has been ascertained.

Dr. Brown, who was assistant director of the chemistry division at Oak Ridge during the war, stated that the techniques for separation of chemical

isotopes developed as part of the work on atom-bomb production will be highly useful in his researches from here on.

In a book, "Must Destruction Be Our Destiny?" which was published shortly after the atom-bombings of Hiroshima and Nagasaki, Dr. Brown was one of the first to raise the disturbing questions of the relation of atomic energy to world peace that are still being debated in world forums.

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ZOOLOGY-AAAS

Killer Trait in Animals

This inherited deadliness to other strains of the same species was discovered in microscopic animals and traced to their possession of the factor Kappa.

➤ **PEACEFUL**, unaggressive citizens of the microscopic world within a drop of water can be transformed into killers by giving them access to the weapons of slain aggressors of their own species. Not only that, but they can also hand down this acquired killer trait to their descendants.

This sinister situation among invisible animals, which might well be a parable for present times in our more magnified cosmos, is a new discovery by Prof. T. M. Sonneborn of Indiana University, whose earlier work on peculiarly inherited deadliness in the so-called slipper animalcule, paramecium, won him the \$1,000 prize of the American Association for the Advancement of Science a year ago. It was disclosed in a discussion with a group of other zoologists who have been working on the same minute animals.

Strain Deadly to Own Species

Among slipper animalcules there are strains whose mere presence is deadly to other strains of the same species. This lethal action is due to their possession of a factor called Kappa, or K (for killer). This killer factor is handed down through the generations in the general protoplasm of the cell, not by means of genes in the chromosomes of its nucleus.

Prof. Sonneborn took large numbers of such K-equipped micro-organisms and made a kind of mash of them by squirting them very forcibly through a hollow needle against a plate; into this debris of dead killer-animals he introduced small numbers of non-killers, each in its own individual kit of this witch-brew. They picked up the killer

factor and made it part of themselves, and thereafter they and their descendants were killers.

Each Carries Killer Factor

In the same discussion, Dr. John R. Preer of the University of Pennsylvania stated that each killer individual carries an armament of between 200 and 800 particles of the killer factor. If a suitably disposed paramecium possesses even a single particle, this particle can multiply itself up to the number necessary to make its owner a killer. Dr. Preer has also measured the size of the deadly particles by means of X-rays. He found that they are larger than genes, more nearly the size of larger filterable virus particles. Dr. Mary L. Austin of Wellesley College added her contribution: a killer individual, to keep the neighborhood unsafe for its fellows, needs to release only one particle of its deadly substance every five hours. One particle is enough to kill an unaggressive neighbor.

Snapping Shrimp Studied

◀ **DARWINIAN** competition for survival goes on not only among the individual animals but among individual cells in the tissues of the same animal, Dr. Hugh H. Darby of the Carnegie Institution of Washington pointed out. He has demonstrated this in experiments in the re-growth of pieces of claw clipped off the snapping shrimp of gulf waters.

When the shrimp next shed its shell and grew a new one, the replacement-

growth on the partially amputated claw was not as large as it would have been under normal conditions. On the other hand, the other end of the claw, which should have merely remained the same size, became larger. Dr. Darby interprets this as indicating a competition for growth material between the two parts of the same claw.

The snapping shrimp, incidentally, has been in the news already. During the war, the underwater noise made by millions of them snapping their claws together fouled up very badly some of the Navy's sound detectors used in tracking submarines.

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Corn is Mexico's most important crop.

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CHEMISTRY-AAAS

Plastic Coats for Eggs

New chemical discoveries also include sulfa drug for animals, flame-resistant paints, fortified margarine with a longer-lasting vitamin A content.

➤ WITH a jingle of chemical formulae, Santa in the guise of chemists is still around, delivering the following new scientific things to the world:

Plastic coats for eggs that will keep them fresh outside a refrigerator for a year.

A new sulfa drug for animals that ought to save a couple of hundred millions of dollars annually down on the farm.

Flame-resistant paints for inside walls that don't need inflammable solvents to carry the new mode synthetic protecting film.

Fortified margarine with a longer-lasting vitamin A content.

A better phosphorus-containing substitute for nicotine (for killing insects, not smoking) that slays bugs that defy DDT.

A new complex liquid, christened DABP, that among other things can bind cloth of glass into a strong, semi-transparent "sandwich."

And a way of using the "drip" from frozen foods, the gooey stuff that comes out of the frozen edibles, to tell just how it is getting along in storage—"almost as important as the information obtained from an examination of human blood" says the scientist.

These new chemical developments were announced to the joint meeting of the American Association for the Advancement of Science and the American Chemical Society.

Dr. Gustav Egloff of the Universal Oil Products Co. told of the plastic film for eggs and the sulfamethazine that promises to control mastitis in cows, shipping fever in horses and some chicken diseases.

L. E. Ludwig of Montgomery Ward Paint Works told of the new paint made of vinyl polymers in water dispersions. A. I. Coombes of Wilson & Co., Chicago, told of the cheaper and long-lasting method of enriching margarine. Prof. L. F. Audrieth and Dr. O. F. Hill of the University of Illinois made atomic geometry studies to pep up the German-born insecticide, HEPT, or hexaethyl tetraphosphate to chemists.

Arthur D. F. Toy, Lee V. Brown of

Victor Chemical Works, Chicago, discovered the plastic, diallyl benzenephosphonate. Prof. Socrates Kaloyereas of Louisiana State University studied the drip.

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AERONAUTICS-AAAS

Airplane Engines Designed By Novel Mothball Method

➤ A NOVEL mothball method helps scientists design lighter and more efficient airplane engines, the American Chemical Society, meeting in Chicago, was told by Prof. Charles C. Winding and A. J. Cheney, Jr., of Cornell University. The mothball material is used in radiator construction to test heat effects.

The new and simple technique for

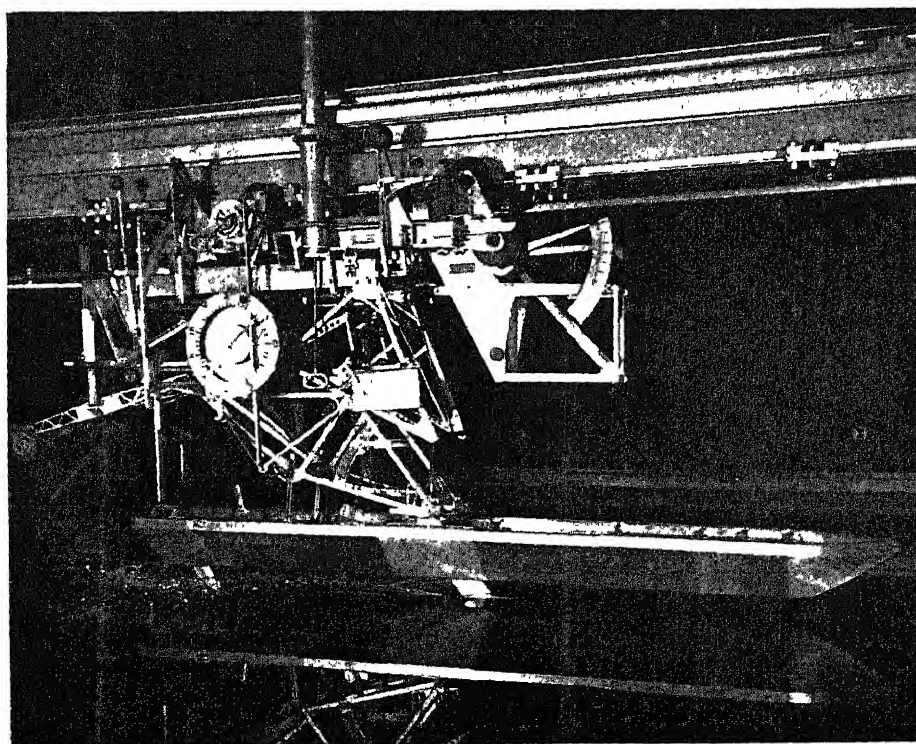
testing designs utilizes models of radiators cast in naphthalene, the white substance of which mothballs are made, they said. Air blown over this chemical causes it to evaporate. By noting the rate of evaporation at different points on the model, engineers can estimate accurately the cooling efficiency of the design.

The conventional method is to cast the radiator in metal and measure its cooling in actual operation. This is a costly and lengthy procedure. The novel mothball method requires the fabrication of simple plaster of Paris molds in place of metal parts. The necessary evaporation measurements are made with one small instrument called a micrometer instead of the elaborate equipment needed to measure heat absorption in metal parts.

This new technique may find many applications in the design of other industrial equipment. Air-cooling plays an important part in air-conditioning and refrigeration, for example. The new method is suitable for design use in these industries.

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Sponges were among the earliest forms of life on earth.



HYDROFOILS—Wing-like projections under a speed boat permit greater speeds because they lift the hull completely out of water. The lift-drag ratio of the foils is higher than that of a conventional semi-planing hull. The picture shows two hydrofoils under a boat and overhead propeller mechanism used in the towing tank at Stevens Institute of Technology.

ENTOMOLOGY-AAAS

DDT Scores More Victories

Black flies, sprayed with the insecticide while in the larvae stage, were completely wiped out in treated brooks. Corn borers also proved vulnerable.

► BLACK flies, just about the most tormenting pest in northern latitudes, have at last met their Waterloo—and DDT was the weapon. Dr. Gustave Prevost of the University of Montreal told entomologists at the meeting how he had treated certain brooks in May, 1946, with DDT; in October, 1947, they were still free of the infernal insects. The trick, said Dr. Prevost, is to catch your black flies in their most vulnerable stage, as larvae. There were neither eggs nor the resting pupal stage when he made his attack. He caught them literally with their armor off—and that was that.

Less complete triumph, but some advance at any rate, was scored in DDT attacks on European corn borers in Wisconsin, where they are a serious threat to commercial sweetcorn and hybrid field-corn plantings. Dr. H. J. Lilly of the University of Wisconsin recommended two dustings with 5% DDT, spaced to catch the young borers just after they have hatched and before they can gnaw their way to safety within the tissues of the plants.

Soilless Gardening Pays

► SOILLESS gardening by the gravel-bed method proved more economical on a strict cost-accounting basis, in a carnation-growing experiment conducted at Colorado A and M College by August Mussenbrock and George Beach. Two identical greenhouse benches were used, one filled with gravel and irrigated with fertilizer-salt solution, the other filled with soil. The cost of producing a crop of flowers on the soil was 28% higher than that on the gravel bed.

Fertility Not Impaired

► LIVING at mountain altitudes has no effect on animals' reproductive ability, despite reports to the contrary from Andean uplands, Prof. Carl R. Moore, University of Chicago zoologist, declared at the meeting.

Prof. Moore had colonies of three kinds of rodents—rats, mice and ham-

sters—kept at four different elevations: 600 feet, at Chicago; and 7,500, 9,600 and 14,260 feet, respectively, in the

PSYCHOLOGY-AAAS

Conflict Induces Crackup

New evidence from rats confirms theory that a nervous breakdown may result from enforced action on impossible problems. Probably applicable to humans.

► IF YOU should have a nervous breakdown, you can blame mental conflict. For some individuals, such physical strains as the noise of battle might cause a crackup, but these are few. Many more break when the noise comes on top of a losing struggle with impossible problems.

At least that is the sort of thing that happens with laboratory rats in experiments reported by Drs. Norman R. F. Maier and Joan U. Longhurst, of the University of Michigan. Rats break down when they are forced by an airblast to jump in a direction they have learned is wrong. The air makes a "Shishsh" noise annoying to humans and very irritating to rats.

Dr. Maier's rats were first introduced to scientists at a meeting similar to this one nine years ago. Then, for the first time, scientists saw, in motion pictures, rats going into fits exactly like human epileptic fits or the convulsions produced by the electric-shock treatment used for the mentally ill. In the excited stage of these fits, the rats run around and around as though crazy. In the rigid phase, they can be picked up and held by the tail as if it were a handle. Dr. Maier called this seizure a neurotic pattern. His report of it received the annual \$1,000 prize of the AAAS.

At the time, scientists were enthusiastic about it, because of the light it might throw on the causes and ways of preventing nervous breakdown, combat fatigue, and possibly also epilepsy in man.

But considerable disagreement among

Rocky Mountains. At all levels, the animals reproduced freely, and all grew healthily to similar sizes and weights. There were no signs of sterility, and growth to sexual maturity was approximately the same in all four places.

The one sign of abnormality was in female mice at the highest altitude. There they seemed to have less milk for their young, and some of them developed a tendency to devour their own offspring.

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psychologists followed. Some believed on the basis of further experiments that it was the noise rather than the mental conflict that brought on the fit.

At this meeting Dr. Maier reported new experiments which test this idea and indicate that he was correct in putting the blame on mental conflict which makes even rats crack up.

In his new experiments, he used 81 rats from 18 different litters. One group of 37 animals were first trained to distinguish between a black circle and a white circle and to jump to the black circle to obtain a reward.

Later these same rats were shown only one of the cards, but were forced by a blast of air to jump, regardless of whether the card shown had the black circle or the white one. When the "wrong" circle was shown, the rat did not want to jump but had to. This formed the "conflict."

Another control group went through the same test of having to jump to a card containing either black or white circle, but these animals had had no previous training to teach them that one circle was right and the other wrong. Thus having to jump to the white circle instead of a black one did not disturb them—there was for them no conflict.

The group faced with the mental conflict had a larger number of seizures per animal than those who were subjected to the noisy airblast alone, in the ratio of 1.6 to .44. And more of the group who had to endure the conflict became subject to fits, 38.8% as compared with 6.7%.

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MEDICINE-AAAS

Bacitracin Goes on Trial

Tests will be made in nine different cities of the new anti-germ chemical to determine the best way of using the remedy before it goes on sale.

➤ **BACITRACIN**, one of the new anti-germ chemicals of the penicillin class, is now becoming available in sufficient quantities to get special trials in nine different cities, its discoverers, Dr. Frank L. Meleney and Miss Balbina A. Johnson of Columbia University College of Physicians and Surgeons, revealed.

The trials are carefully planned to show the possibilities and best ways of using the new remedy before it goes on sale generally. At the same time, the U. S. Food and Drug Administration is setting up tentative standards and specifications for potency and safety.

The nine cities selected for the clinical trials of the new drug are: New Orleans, San Antonio, Rochester, Minn., Madison, Wis., Cincinnati, New York, Philadelphia, Baltimore and Charlottesville, Va. They were chosen in order to get a wide variation in climate, temperature, general physical condition of patients and differences in economic level. All these factors, Dr. Meleney explained, can affect the results of treatment.

Favorable results have been obtained in 86% of the 186 cases of surgical infections already treated by local application of bacitracin. These cases ranged from boils and styes to such conditions as cellulitis and chronic osteomyelitis.

Bacitracin is an antibiotic, or anti-germ chemical from a germ, obtained from a strain of *Bacillus subtilis* found in the tissue removed in cleaning up the wound in a compound fracture case. Because the patient's name was Tracey, the discoverers named the strain of bacillus the Tracey strain and the antibiotic it produced bacitracin.

It was used at first to treat surface infections by local application. It has now been purified so that it can be safely given by injection in cases in which the infection has spread beyond the local area and is involving the body generally.

Develop Many Antibiotics

➤ **ANTIBIOTICS**, or drugs like penicillin and streptomycin, are being developed at a bewildering rate; yet the

future holds challenges that scientists have not yet begun to meet, Prof. Selman A. Waksman of Rutgers University, pioneer in this field, declared. Molds and bacteria that produce only one antibiotic apiece are outdistanced now by species that produce as many as half-a-dozen.

Among the needs that must be met, Prof. Waksman listed antibiotics that will attack filterable viruses, and others that will act against abnormal tissue growths like tumors. It is also desirable to overcome the development of resistance in certain bacteria to the action of antibiotics. Finally, we still need to find out how antibiotics work.

Decay Immunity Factors

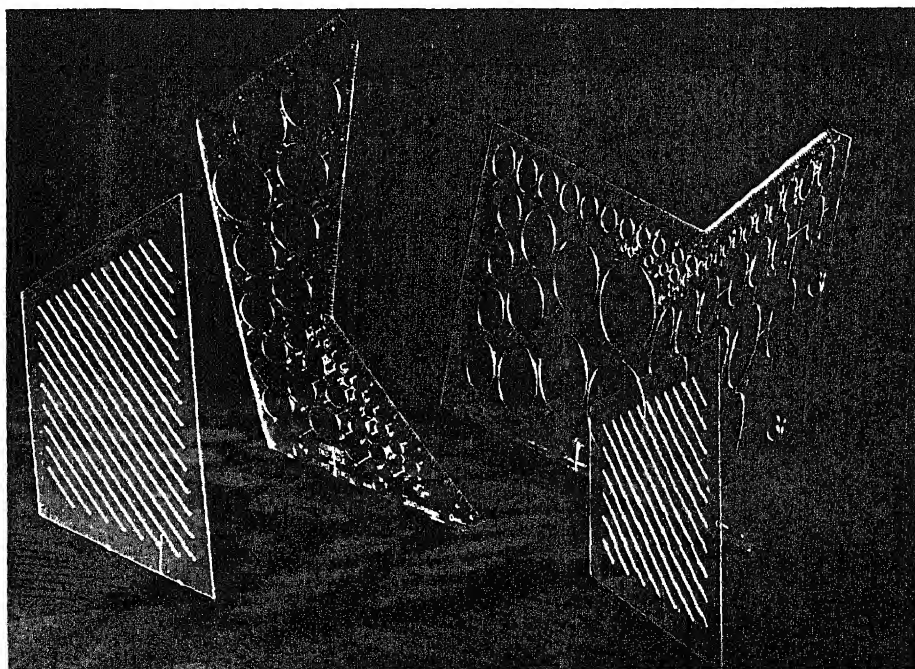
➤ **SIX** factors that make teeth immune, or resistant, to decay were reported by Dr. L. S. Fosdick of Northwestern University Dental School.

These factors are none of them like

the blood substances that give immunity, or resistance, to measles. There are probably no anti-decay substances in the blood. They may exist in the saliva, but so far no one has discovered them. But some people have teeth that are immune to decay and others have periods when their teeth do not decay. Prisoners in German and Japanese concentration camps, for example, had caries, or tooth decay, before but not during the time they were in the camps. Reviewing present knowledge of tooth decay, Dr. Fosdick finds the following six factors in decay immunity:

1. A copious or at least moderate flow of saliva.
2. Ability of the saliva to neutralize acid.
3. The concentration of calcium and phosphorus in the saliva.
4. The anatomy of the mouth and teeth. Perfectly arranged teeth that meet correctly for chewing and biting and that have few pits and cracks or teeth that are widely separated, so that they are relatively self-cleansing, have less tendency to decay.
5. The dental plaque, a tenacious covering on the teeth, and the bacteria in it.
6. The natural resistance of the teeth to acid decalcification.

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DRAFTING STENCILS—Made from rigid sheets of plastic, the stencils have extrusions on both sides so that they are never in contact with the paper, providing a perfect inking-edge and minimizing the danger of smudges on the drawing.

ICHTHYOLOGY-AAAS

Fish Found To Possess Acute Sense of Smell

➤ FISH have an acute sense of smell. They can tell the difference between the scents of underwater plants even more sensitively that you can tell the difference between rose and violet perfumes.

At the meeting, T. J. Walker, University of Wisconsin zoologist, told of experiments in which he demonstrated how well fish smell. He arranged an aquarium in which two currents of water could be circulated without becoming mixed. Thus it was possible to introduce simultaneously water in which two different species of water-plants had been washed, and let the fish choose between their respective scents.

The minnows used in the tests were trained to prefer certain plant-scents by rewarding them with food when they swam into their areas. They also were trained to shun others by giving them slight electric shocks when they swam towards them. The majority of the fish used became rather discriminating after a suitable training period.

The water samples in which various aquatic plant species were washed were all scentless to human nostrils, but the little fish knew the difference even when they were greatly diluted.

Mr. Walker suggested that it might be possible to use similarly trained fish to detect traces of contaminating substances in water that seems all right to ordinary examination and chemical tests.

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ICHTHYOLOGY-AAAS

Fish Yield of Streams Increased by Fertilizer

➤ DISSOLVING farm fertilizer in a running stream would seem at first blush to be sheer waste. But it is not; bread cast thus upon the waters returns presently in the form of fish.

At the meeting Dr. A. G. Huntsman of the Fisheries Research Board of Canada and the University of Toronto told of the first attempt to increase the fish yield of running streams by use of fertilizer.

The experiment was stimulated by observations that salmon, as well as the water organisms they feed on, were more abundant below a cattle ford on a certain shallow stream in Nova Scotia. In one test, fertilizer was simply scattered on

the water; in three others, bags of fertilizer were so placed that their contents would slowly dissolve.

In all cases a notable increase in the number of fish took place. There was a kind of house-that-Jack-built sequence. The fertilizer brought about a heavy increase in the simple water plants known as algae. Insect larvae that feed on algae then increased. Increase in numbers of minnows followed. Finally, the big fish that eat little fish also multiplied.

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NUTRITION-AAAS

Iron Absorption Increases With Vegetable Intake

➤ IF YOU have to take iron as a medicine, eat some fruit or fresh vegetables at the same time. That seems to be the practical conclusion pointed to by experiments reported by Prof. Ernest R. Kirch and associates of the University of Illinois. Iron compounds were reduced to the chemical state best fitted for absorption into the system when fruits and vegetables were added to the solution. Next in efficiency in making the iron absorbable were egg white, meat and bread. Milk and egg yolk had little effect.

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BIOCHEMISTRY

Asparagus Has Weapon For Fight Against Germs

➤ ASPARAGUS and an anti-war gas chemical are the latest additions to germ fighting weapons, it appears from reports to the journal, *Science*, (Dec. 26).

The anti-TB germ activity of streptomycin and subtilin are stepped up by the anti-war gas chemical, BAL, Drs. Hamilton H. Anderson and Yin-Ch'ang Chin of the University of California Medical School report.

Asparagus contains a substance called quercetin which stops the growth, and therefore the poison production, of the botulinus organisms, Drs. A. A. Andersen and J. A. Berry report from the U. S. Department of Agriculture's Western Regional Research Laboratory at Albany, Calif.

This discovery followed the Agriculture scientists' finding that although asparagus is attacked by many germs that spoil vegetables, it is a poor medium for the growth of the botulinus organism, cause of many a case of fatal poisoning.

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AGRICULTURE-AAAS

Milk-Fed Vegetables Have Increased Yield

➤ MILK-FED vegetables can be expected presently to join milk-fed chicken and milk-fed veal on our tables—or maybe replace them, if present meat price trends continue. Drs. V. E. Iverson and L. H. Johnson of Montana State College told the meeting how they had markedly increased the yield of tomatoes and onions by adding buttermilk and skimmilk to the soil, either alone or in combination with commercial fertilizer.

Not only were the yields increased but the soil was left in better condition, both physically and chemically, after the tests.

These experiments point to possible profitable use for low-value dairy products in butter-making areas where marketing buttermilk and skimmilk cannot be handled at a profit. This use of milk products is of course quite different from the "fattening" of pumpkins and squashes by feeding milk into them through a wick. This is done mainly as a "stunt," and in any case could hardly be carried out on a mass-cultivation basis.

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BOTANY-AAAS

Experiments Show Camphor Can Be Grown in U. S.

➤ CAMPHOR, necessary in both medicine and industry, can be successfully grown in the United States as far north as Boston, thus rendering America independent of the easily-cut-off source of natural camphor on Formosa Island off the China coast; Prof. Heber W. Youngken and William E. Hassen, Jr., of the Massachusetts College of Pharmacy indicated in a report.

The new potential source of home-grown camphor is not the camphor tree of Asia but a shrubby bush from Africa known as the camphor basil. It grew well and healthily as an annual crop when planted in lightly-limed Massachusetts soil. Dried leaves and flowering tops harvested in late October yielded 2.5% of oil and 2.54% of camphor.

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EMBRYOLOGY-AAAS

Cancer and Embryo Growth May Be Related in Fish

➤ **SIMILARITY** between cancer or tumor growth and the rapid growth of embryos, or unborn young, has often been commented on by scientists. That such growth is not only similar but perhaps related was demonstrated in experiments reported by Dr. Paul S. Galtsoff and Eugenia Galtsoff of the U. S. Fish and Wildlife Service, College Park, Md.

Into the bodies of toadfish, a non-commercial species common in shoal coastal waters, they implanted embryo fish of the same species. Later, when the specimens were killed and dissected, they were found to contain tumors, some of which resembled sarcomas and other malignant growths. The implanted embryos, too, had suffered: they had lost their eyes, their nervous systems had degenerated and general physiological anarchy had set in.

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ASTRONOMY-AAAS

Huge Flares of Hot Gas Shoot from Double Star

➤ **FLARES** of hot gas, similar to the great flaming prominences that rise from the sun but much more enormous, have been discovered to shoot out from the double star, RS Canum Venaticorum.

But strangely enough, these flame-like clouds of gas, instead of bursting forth in all directions, rise only from a small area facing the bright companion star, and possibly on the side directly opposite, Dr. W. A. Hiltner of Yerkes and McDonald Observatory of the Universities of Chicago and Texas stated at the meeting.

The eclipsing binary is composed of two stars, each about twice as massive as the sun. The brighter member of this whirling team has a radius 1.6 times that of the sun; the radius of its companion is 5.4 times as large as the sun's.

When the brighter, smaller star is eclipsed by its companion, for observers on earth it loses 70% of its light. When the same star passes in front of its larger

and fainter companion, there is little change in its apparent brightness.

The double star's peculiar actions, however, were discovered when the brighter star passed in front of its companion. The total disappearance of one of the bright lines in the star's spectrum gave away its secret.

By measuring the wavelength of the calcium emission lines of the star's spectrum, Dr. Hiltner stated, we know that this light comes from the large secondary star. If the luminous gas responsible for this calcium line were distributed uniformly over the surface of the large star, its brightness would be changed only 10% as the smaller star passed in front. But the line completely disappears.

The calcium atoms with one electron removed, responsible for this bright line in the star's spectrum, thus must be clustered together in a small area, a region that is completely hidden by the smaller star during an eclipse.

To date, great flaming prominences have been detected on several double stars. This star, however, is much brighter than those previously investigated and thus more could be learned about it.

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GENETICS-AAAS

Bikini Radiations Cause Changes in Cotton Plants

➤ **ATOM-BOMB** radiations struck a small packet of cotton seeds exposed on the deck of one of the Bikini test ships. Last summer, plants grown from those seeds developed abnormalities, internal and external, Dr. Meta S. Brown, cytologist at the Texas Agricultural Experiment Station, told fellow-scientists at the meeting.

Most of the changes from normal were internal, and consisted in dislocations, or even total destruction, of the heredity-bearing chromosomes. This can be very serious, even when it does not show in the first generation grown from the seed; for these changes are passed on into succeeding generations and abnormalities may show up later. And what happened to a cotton seed might happen to a man.

At least one of the plants did show a marked change from the appearance of others from the same lot of seeds. It was stocky, low and bushy, without the long upreaching ends on most of its branches that normal cotton plants of the same strain show.

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ASTRONOMY-RADIO

Radar Mirrors Aid Study Of Radio Noises from Sun

See Front Cover

➤ **THE** sun is attacking the earth with hissing and popping noises. The Bureau of Standards is starting out to investigate these radio noises originating in the sun. Two giant radar mirrors are being set up for this study at the radio propagation laboratory in Sterling, Va. These solar noises are becoming increasingly important with the use of higher and higher frequencies in communication and radar equipment.

These radio waves sent out by the sun may prove useful in many ways. A radio sextant might be built, for instance, that would use solar noise to determine the position of a ship at sea. Ships could thus navigate by the sun despite overcast skies.

Frequencies and intensities of solar radio waves are to be investigated and the actual sources of these waves determined as closely as possible with two giant radar mirrors measuring about 25 feet in diameter. These mirrors, which will be automatically directed toward the sun during the day, as shown on the cover of this week's *SCIENCE NEWS LETTER*, can capture a large amount of energy from the solar broadcasts.

Radio waves constantly pouring out from the sun, interfere with reception of broadcasts over very-high and ultra-high frequency receivers. They are heard as short "puffs" and "swishes" that last a second or more. Sometimes these "swishes" overlap, resulting in an irritating grinding noise which may cause streaking on a television screen and picture jumpiness.

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BIOCHEMISTRY-AAAS

Plant Growth Substances Speed Mosquito Hatching

➤ **POSSIBILITY** that at least some insects are aided by the growth-promoting substances, or hormones, of plants was pointed out by Dr. Albert Abdel-Malek of the Ohio State University. He experimented with one species of mosquito, which passes the winter in the egg stage. He found that a blue-grass infusion encouraged egg hatching. Later, he obtained a similar result with low concentrations of three synthetic growth hormones: naphthalene acetic acid, indole butyric acid and indole acetic acid.

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MINERALOGY

Untapped Sources of Oil

Greatest potential source is the ocean bottom. Other inaccessible places may contain oil but the problem is to find it and get it out.

By A. C. MONAHAN

➤ THERE is plenty of oil in the earth's crust, scientists say. The problem is how to find it, and then how to get it out. The greatest untapped source is the 10,000,000 square miles of continental shelf that extends from a few to a few hundreds of miles underwater from the shores of continents and islands.

There is also plenty of unfound oil in dryland areas, they believe. But it is deep down, perhaps a mile or more, below the present known deposits. Or it is beyond the Arctic Circle, buried below accumulated ice and hundreds of feet of frozen earth. And perhaps it is in accessible places but not in the ordinary petroleum traps from which most crude oil is now obtained. To locate this oil, new scientific instruments are needed. Geophysicists are working frantically to develop them.

Geologist Explores for Oil

The petroleum geologist is the number one man in oil exploration. There is no divining rod that will locate petroleum. The first step, after surface surveys, is a wide and intensive study of the underlying structure of the earth in the general type of geological formation favorable to oil formation. In these every bit of geological information must be taken under consideration. Included are rock outcrops on the surface, crust structures within mines if any are in the region, and the logs of every deep well drilled in the general area whether for deep water, minerals or any other purpose.

Geologists now know the crust of the earth from the Arctic to the Antarctic well enough to be able to plot roughly the areas favorable for finding petroleum deposits. They call such regions "petroliferous." These areas now must be closely studied by geologists and geophysicists, the latter using such instruments as the seismograph, gravity meter and the magnetometer.

One noted petroleum geologist estimates that there are 1,000,000,000,000 barrels of oil in the world's continental

shelf. He is Wallace E. Pratt, former vice-president of the Standard Oil Company of New Jersey, who has devoted much of his life to the application of geology to the discovery of petroleum. Exploration for this oil has not yet reached the drilling stage, except relatively near shore, but ocean-bed instrument studies are being made in the Bahama seas, some 200 miles off the coast of southern Florida. The scientists are working deep in the water under diving bells.

Many Oil Wells in Ocean

There are, of course, many producing oil wells in the ocean offshore from California, Texas, Louisiana, Venezuela and elsewhere. They are largely in proven areas that extend under the sea from producing field ashore. Three wells have been drilled from 10 to 30 miles out from Louisiana in the Gulf of Mexico, and several others are planned.

Much of the petroleum in continental shelves can never be recovered because of the depth of the water over them and their location, such as in the Arctic ocean. No one has yet figured out the best way to mine the under-ocean oil. At the 10-mile well off Louisiana, the plan used was relatively simple because the water at the site is only 16 feet deep at low tide.

A platform on piles was erected 20 feet above mean high water. This gives protection against high waves. The platform is large enough to hold all drilling equipment, fuel, fresh water and standby units.

One suggestion of how to tap the continental shelf oil is by the use of anchored diving bells, large enough to house a derrick and drilling rig. Underwater pipelines would bring the oil ashore. Another is to use large floating platforms of the type once proposed for mid-ocean landing fields for transatlantic airplanes.

A third suggestion is to tunnel out from the shore through the ocean bed to the oil sands and drill the wells in the tunnel.

It is not expected that there will be any

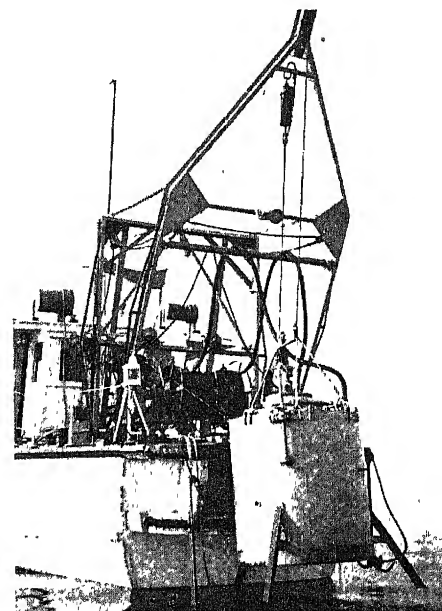
attempts to tap oil supplies deep under the ocean while a plentiful supply can be obtained otherwise. There is much petroliferous area in the world as yet unexplored. Active explorations by instruments and core-drilling are underway in many of them, including Australia, a continent producing no petroleum as yet, Siberia, Alaska and in both the Americas.

Other Sources of Liquid Fuels

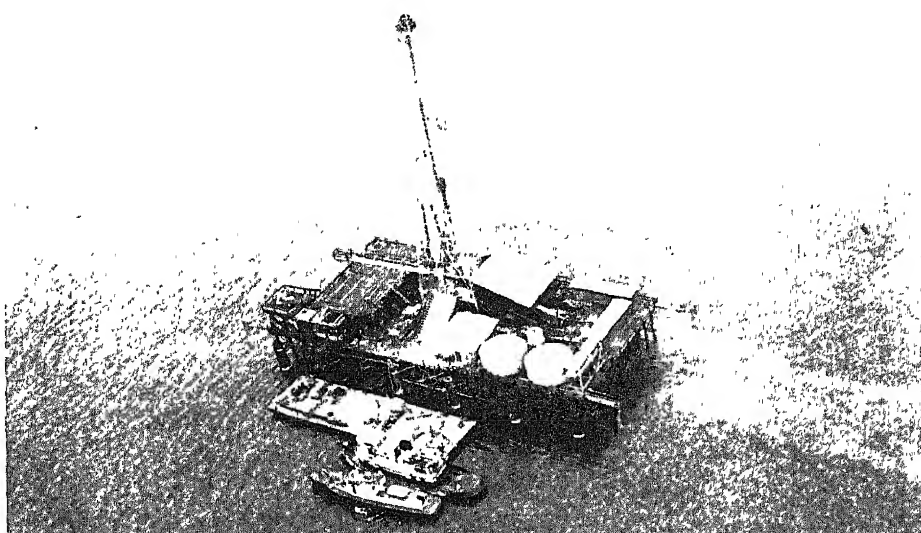
There is also the possibility that continental shelf oil may never be needed, particularly if liquid fuels can be obtained cheap enough from coal, oil shale or natural gas. Liquid fuels from vegetation, such as alcohol, may also limit the need for gasoline.

Of more immediate importance than the oil in the continental shelf, of which the United States has a million square miles, is the hidden petroleum in petroliferous areas within the continent. About one-eighth of the petroliferous areas of the world are in America.

They are largely in the interior. One great area extends northwesterly from



DIVING BELL — Engineers with gravity instruments are being lowered in this apparatus off the Florida coast in the Bahama seas. They are studying structures holding oil for the Standard Oil Co. of New Jersey.



BORING UNDERWATER—Ten miles out in the Gulf of Mexico the search for hidden oil goes on. This picture shows the operation of well-boring underwater from a platform by the Magnolia Petroleum Company.

Texas, passing just east of Denver, through the Wyoming and Montana oil fields up to Calgary, Canada. After a break, it goes almost up to adjoin the North Alaska field now being drilled by the Department of the Navy.

Another area extends westward from the present Ohio and West Virginia fields to the Mississippi, covering Lower Michigan. Less promising geological formations exist in Florida, Southwest Alaska, Hudson Bay country and along the Arctic coast of North America. The Uinta Basin, eastern Utah, now under exploration, is expected to yield much oil.

New Exploratory Methods

To the layman any method of determining the deep underground structure of the earth without digging deep shafts or drilling wells seems a mystery. However, scientists are using several. The seismic, gravity and magnetic methods have proved most useful. Now technicians are attempting to employ induction currents and radio.

The seismic method, perhaps the most helpful of those used, employs the seismograph, best known to the public as the device used to detect and record earthquake tremors. In this method, explosives are used near the surface to set up sound waves, some of which go downward deep into the earth. They are reflected back when they hit a dense layer of minerals. The reflections are recorded at several scattered stations;

then the location of the layer is determined by mathematics.

In the gravity method, deviations in the direction of the force of gravity caused by dense underlying formations are measured. The magnetic method depends upon the influences of underground structures on a free-swinging magnetic needle. The instrument used is called a magnetometer.

Essentially a magnetic survey is a method of determining the contours of underlying granites and other formations known to scientists as the "crystalline basement." A knowledge of this basement, particularly in areas covered by marine sediments, is of fundamental importance to oil exploratory work. The magnetometer, for detailed work, is ground-based, often trailer-mounted. For general preliminary surveys the same magnetometer which was trailed behind and under airplanes to detect submerged Nazi U-boats is employed. It has been used for greater details than can be obtained with planes, borne by a helicopter.

Radio Seems Promising

Several electrical methods have been tried to locate oil deposits. Now the use of radio seems promising. A government patent, No. 2,426,918, was issued Sept. 3, 1947, to William M. Barret, Shreveport, La., for a method developed by him. He states that he has found earth layers do not quench electromagnetic waves of radio frequency as rapidly

as had been assumed, so that he can project them into the ground and receive their echoes.

Another electrical instrument is under development in the New York laboratory of Frank Rieber, an inventor well known for his widely used refraction and reflection seismograph. The instrument will use radio reflections rather than shock waves by man-made explosions as with the seismograph.

Instruments Find Oil Traps

Present exploratory instruments are successful in locating oil in what are known as traps formed in the earth's crust by overlaps and folding of underground strata. But all oil is not in such traps, Mr. Rieber believes. There is oil in traps of a different sort, widely spread in porous layers between other layers. He calls the first a structural trap; the second, a stratigraphic trap. The instrument on which he is working is primarily to discover the oil in these stratigraphic traps by locating porous layers and tracing them to spots where the oil might accumulate.

Present known oil reserves in the United States may become exhausted in from 15 to 30 years, as many believe, but oil men all seem to feel that undiscovered deposits will keep the country supplied for a much longer period than that.

Science News Letter, January 10, 1948

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BIOCHEMISTRY-AAAS

Mutations with Chemicals

➤ **CANCER-CAUSING** chemicals can also cause the sudden evolutionary changes known as mutations, Dr. M. Demerec of the Carnegie Institution of Washington announced at the meeting. This points to the opposite possibility that mutation-causing chemicals may cause cancer, and must therefore be avoided or at least handled with extreme caution.

Dr. Demerec's experimental results support the theory already advanced, that cancer cells behave like strangers in the bodies they afflict because they have actually become strangers through mutational changes. If this is true, he commented, "our chances for finding ways to prevent it are very, very slight."

However, it should be possible to reduce the frequency of cancer by avoiding contact not only with cancer-causing chemicals but with chemicals known to cause mutations, and extensive research for the mutation-causing properties of all sorts of compounds appears to be in order.

Dr. Demerec demonstrated the possi-

bility of chemical production of mutations by exposing the geneticist's favorite animals, fruit-flies, to an exceedingly fine mist or aerosol of a war gas that was never used in war, one of the nitrogen mustards. The bodies of insects are so constructed that air and anything that may be in it comes into direct contact with their sex glands, thereby exposing them to mutation if the appropriate chemical is used. Now he is continuing the experiments, with aerosols of various cancer-causing compounds, as well as other chemicals not yet proven guilty.

Cancer-causing chemicals can change the heredity of animals from cancer-resistant to cancer-susceptible, Dr. L. C. Strong of Yale University reported. Into mice of an inbred strain that normally lost only six-tenths of one per cent of its numbers to cancer he injected the cancer-causing chemical, methylcholanthrene, keeping up the treatment through nine successive generations. After this, nearly two-thirds of the mice of this strain developed cancer, and the tendency had become hereditary.

Science News Letter, January 10, 1948

NUCLEAR PHYSICS-AAAS

Mesotron May Be Created

➤ **WITHIN** the next few months, giant high voltage machines should create one of the fundamental particles of matter, the mesotron, which up to now has been seen only rarely as a result of cosmic rays smashing into the upper atmosphere of the earth.

This prediction by Prof. Marcel Schein of the University of Chicago raises hope that the role of this particle, intermediate between electron and proton, will be discovered.

Observations made on America's highest peak, Mt. McKinley, by a mountaineer colleague, Dr. V. Victoreen, allowed Dr. Schein and T. H. Carr of the Navy cosmic ray project to conclude that five giant atom-smashers operating in 1948 have a chance to generate mesotrons artificially. At 18,200 feet the energies of natural mesotrons are between 150 million and 400 million electron volts. Five accelerators—the one already operating at the University of California and those at Columbia, Rochester, Cornell and Harvard Universities to go into service this year—attain such energies.

Just as the neutron unknown a few years earlier was the key that unlocked atomic energy, so the mesotron may explain the mystery of the forces that hold the atom together.

Already three weights of mesotrons are known and physicists expect that other varieties will be found during their searches on this new atomic frontier.

To duplicate, under controlled conditions, what only the harder cosmic rays can do so far, hope was expressed by Dr. Leland J. Haworth, assistant director of Brookhaven National Laboratory on Long Island, N. Y., that there would be constructed two giant accelerators operating at billions instead of mere millions of electron volts. The top energy of these machines would be ten billion electron volts. Plans for a similar machine on the West Coast at Berkeley were announced earlier.

Science News Letter, January 10, 1948

Bubonic plague in humans, which usually is transmitted to them from rats and other rodents by fleas, is called *sylvatic plague* in the animals.

PHARMACOLOGY

Weak-Action Antiseptics

Three mercurial compounds were found ineffective as germ-killers and also poor disinfectants. These tests were carried out on mice.

► THE usefulness of three mercurial antiseptics, used by many lay persons to prevent infections in cut fingers and the like, is challenged in a report issued by the *Journal of the American Medical Association*, (Jan. 3).

The compounds are mercurochrome, merthiolate and metaphen.

They are not effective as germicides (germ-killers) nor as antiseptics and they have many shortcomings as disinfectants, report Dr. Harry E. Morton of the University of Pennsylvania, Dr. Leon L. North, Jr., of the Philadelphia General Hospital, and Frank B. Engley, Jr., of Camp Detrick, Md.

Their report is based on studies made at the University of Pennsylvania aided by a grant from the American Medical Association.

Tests were made with samples of the compounds purchased over the counter from various drug stores. Cultures of virulent hemolytic streptococci were treated with these compounds so that the germs were exposed to the action of the compounds for 10 and 15 minutes. Then the germs were injected into the peritoneum (the membrane lining the belly walls) of mice. The mice usually died and hemolytic streptococci could be isolated from their hearts' blood.

This showed that the chemicals did not kill the germs and did not keep them from being infectious. The compounds tested do check the growth of the germs, but this is not enough, the experiments show, to keep them from causing infection. For that, the germs must be killed.

The question as to whether a germ-checking compound is effective for use on a cut or wound to prevent infection is, the scientists state, beyond the scope of their report. But they point out that another scientist has reported that germs checked only by mercurial compounds are still capable of causing local infection, such as skin abscesses, when introduced into the skin.

The three compounds tested, they also point out, have been reported by other scientists to be more poisonous to embryonic tissue cells and to white blood cells than to bacterial cells.

Germes other than the hemolytic strep-

tococci tested by the Philadelphia scientists might be affected differently by the mercurial compounds, Dr. Austin Smith, secretary of the A. M. A. council on pharmacy and chemistry, points out.

Infection of animals by influenza virus can be prevented by treating the virus with some of these compounds, it has been reported, and they have also been reported capable of inactivating the poliomyelitis virus.

Those who argue in favor of the mercurial compounds should, he states, "proceed seriously and diligently" to the task of exploring, proving and defining the field of usefulness of the compounds. The A. M. A. council is ready to give them an opportunity to meet the challenge, but, Dr. Smith warns, it is a field "in which wishful thinking is dangerous."

Science News Letter, January 10, 1948

ASTRONOMY

Find Many Gaseous Clouds In Interstellar Space

► MANY small gaseous clouds fly around in space against a background of larger and deeper clouds that seem to move along with the stars of our stellar system. Yet these enormous clouds do not share the motions of the individual stars, Dr. Walter S. Adams, director emeritus of Mount Wilson Observatory of the Carnegie Institution of Washington, stated in giving the Henry Norris Russell lecture before the American Astronomical Society meeting in Columbus, Ohio.

These gaseous clouds are made up of such elements as potassium, sodium, iron, calcium, ionized calcium and titanium and others. In all, astronomers have found 26 spectral lines that are added to a star's spectrum by material in space between the earth and the stars.

These interstellar gases have been identified by studying the spectra of such hot stars as Rigel in the constellation of Orion. The stars were chosen because they have relatively simple spectra.

In size the clouds range from one that covers a large portion of the constellation of Orion to others that do little

more than cover a wide double-star system. As many as four or five separate clouds are occasionally distinguished in the path of light from a not-too-distant star.

Most of the clouds move quite slowly, but a few between us and distant stars travel with a speed as high as 62 miles per second.

Science News Letter, January 10, 1948

ZOOLOGY

Mother Whale's Milk Found To Be Rich in Vitamin C

► YOUNG whales get concentrated vitamin in their mothers' milk, it appears from analyses in the British science journal *Nature* (Sept. 27). Prof. Michael Begg of Marischal College, Aberdeen, reports that in a small quantity of milk from the main duct of the mammary gland of a captured Antarctic fin whale the rickets-preventing ascorbic acid (vitamin C) had nearly double the concentration of the same vitamin in cow's milk at its best. It was close to the best assay for vitamin C in human milk.

Science News Letter, January 10, 1948

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Bird-Borne Seeds

➤ UNTIL recently, earthbound man could only dream of flight, longingly watch the birds—and stay right there on the ground. Yet for ages many plants, though blind, unconscious, unknowing, have borrowed birds' wings for their seeds.

Evidences of these borrowed flights are so common all about us that as a

rule we pay no attention to them. Because the survivors of such voyages sprout in every fallow field, stand thick in every fence-row, a veteran naturalist, W. L. McAtee of the U. S. Fish and Wildlife Service, has summed up the situation in a study presented by the *American Midland Naturalist*.

Birds that eat seeds as food, in particular weed seed, are seldom active agents in disseminating those particular species, Mr. McAtee believes. The seeds are ground up in their gizzards, digested, and that is the end of them.

Jays, woodpeckers and other birds that carry off acorns and other large seeds, however, often unwittingly plant them. They may drop them in flight, or after they have hidden them they may either forget about them or die and leave them unused, to sprout in the spring.

Intermediate between these two classes one might notice a group of birds that

often dig conifer seeds out of their cones. Included here would be crossbeaks, siskin, grosbeaks and several other members of the finch family. The seeds they swallow do not survive; but in their diggings and prying they often drop some seeds, which then swirl down the wind on their own wings. The birds here are not carriers, but launchers only.

Birds that eat seeds covered with more or less palatable pulp are perhaps the most effective agents of distribution. Here the pulp alone, as a rule, serves as food; the seed passes through the digestive tract unharmed and is dropped under the bird's perching-place. That is why fence-rows, stone walls and similar places are apt to be marked by rows of red cedar trees, and to be covered with growths of such berry-fruited scramblers and vines as Virginia creeper, wild grape, poison ivy, moonseed, false bittersweet and dewberries.

Science News Letter, January 10, 1948

MEDICINE

Cancer Cure from Vitamin?

➤ IS A cancer cure coming from a vitamin? It is too soon to tell but signs begin to point that way.

Latest of these signs appears in a report from a six-man research team headed by Dr. Sidney Farber of Children's Hospital, Boston, to the journal, *Science* (Dec. 19).

These doctors have in the past year treated well over 150 patients, suffering from many kinds of cancers, Hodgkin's disease and leukemia, with two vitamin chemicals. The chemicals are difolic acid and trifolic acid, known also as dipterin and teropterin. They are closely related to folic acid, one of the new vitamins which has been useful in treating certain kinds of anemia.

The patients were all in the last hopeless stages and more than a score have died. Those still living feel better, have less pain, eat better and have more energy.

Some of this improvement may be psychological, the result of knowing a new treatment was being used. Some is believed due to the vitamins.

But the vitamin treatment is "definitely not a cure for cancer at this time," Dr. Farber stated.

The vitamin chemicals used cannot be bought at the drug store and they should not be used in routine treatment of cancer patients, Dr. Farber and co-workers agree.

They are safe to use in that they do

not have any poisonous effects. Most of the report is on the tests for possible bad effects and on the doses to be used in experimental treatment with the vitamins. They are given by injection into the muscles though they can be injected into the veins or given by mouth.

The two vitamins, while not yet a cure, have "opened a door" beyond which may wait the vitamin or other chemical or combination of them that will be a cure for cancer. Within the next six months or a year, the picture may change greatly and scientists may be trying other, better cancer-fighting chemicals found by following the lead of this work with the folic acids.

The Boston doctors were the first to use the folic acids in treatment of human cancer patients, though other doctors have begun using them also on an experimental basis. The Boston group is still using trifolic acid and difolic acid but they are also investigating other, related chemicals. They have found a "very interesting lead" which is taking them far beyond the work now reported.

Dr. Farber's associates in the studies, at Harvard Medical School, Peter Bent Brigham Hospital and New England Deaconess Hospital, have been Drs. James W. Hawkins, J. Hartwell Harrison, E. Converse Peirce, 2nd, Gilbert G. Lenz and the late Dr. Elliott C. Cutler.

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* Kulp, J. L., Kerr, P. F., *Science*, Vol. 105, p. 418, 1947.



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AMERICAN PHARMACY—Edited by R. A. Lyman—*Lippincott*, 379 p., illus., \$7.00. This book supplements Vol. I; it contains detailed information on advanced pharmacy, including medical and surgical supplies and a chapter each on dental supplies and animal health pharmacy.

FISH PONDS FOR THE FARM—Frank C. Edminster—*Scribners*, 114 p., illus., \$3.50. The Chief of the Northeast Regional Biology Division, U. S. Conservation Service, describes design, construction, stocking, and management of the fish pond for productive purposes.

HIGHER EDUCATION FOR AMERICAN DEMOCRACY: Vol. I—Establishing the Goals—A Report of the President's Commission on Higher Education—*Govt. Printing*, 103 p., paper, 40 cents.

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INDIAN SKELETAL MATERIAL FROM THE CENTRAL COAST OF PERU—Marshall T. Newman, with a synopsis of the archaeology by Gordon R. Willey—*Peabody Museum of American Archaeology and Ethnology*, Vol. XXVII, No. 4, 71 p., plates unpaginated, illus., paper, \$2.50.

JANE'S FIGHTING SHIPS: 1946-47—*Macmillan*, 471 p., illus., \$20.00. The latest edition of this book of naval sea craft contains almost 600 new illustrations, with appropriate textual revisions.

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ASTRONOMY

Galaxies Have Rosy Tint

➤ DISTANT galaxies, systems of billions of stars like the Milky Way system of which the earth is a part, have been found to be distinctly redder than nearby ones. This reddening makes the galaxies appear fainter to the photographic plate than they would otherwise be. It may mean that the 200-inch telescope on Mount Palomar will not penetrate space so far as was estimated.

The cause of the reddening is not known. This reddening is over and above the well-known red shift of the spectrum lines due to the apparent expansion of the universe and is several times greater than would be expected from the red-shift alone.

This rosy tinting of distant galaxies is important as the theory of the expanding universe is based on estimates made from the apparent magnitudes of distant galaxies. If these galaxies get progressively dimmer than normal from the distance increase alone, then the magnitudes and resulting distances must be drastically revised.

The reddening of distant star systems was found through use of a dry-ice refrigerated photoelectric photometer placed at the focus of the 100-inch telescope on Mount Wilson. The observations were carried on by Dr. Joel Stebbins and Dr. A. E. Whitford, both of Washburn Observatory, University of Wisconsin. Drs. E. P. Hubble and Walter Baade, both of Mount Wilson Observatory, advised them and helped with the work.

The colors of the galaxies, the Washburn Observatory astronomers reported at the American Astronomical Society

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Science News Letter, January 10, 1948

meeting in Columbus, Ohio, were determined by measuring the relative brightnesses through yellow and blue filters. The new reddening is proportional to the shift of the spectrum lines, and has been followed for the nearest examples, comparative neighbors of the sun less than a million light-years away, to a member of the cluster of galaxies in the constellation of Bootes, two hundred million light-years away.

This reddening, small though it is, is very hard to explain. One tentative explanation is that the huge reaches of intergalactic space contain dust and gas like that in the galaxy. But the required quantity of "intergalactic dust and gas" which would account for the observed reddening would increase the total calculated amount of matter in the universe by as much as a thousand times. This might require an actual reduction in the theoretical size of the universe.

Science News Letter, January 10, 1948

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⚙️ **TELEPHONE EARPIECE ATTACHMENT**, which fits over the earpiece but has no electrical connections with the telephone, enables incoming voices to be heard through the radio loud speaker. It is a midget inductor unit designed to operate with the standard radio receiver or any type of disk-wire-film-cylinder electric recorder.

Science News Letter, January 10, 1948

⚙️ **TREE-MARKING** device for foresters, to indicate trees for cutting by a paint spray, is quickly converted into a torch for starting back-fires in case of a forest fire. Conversion is made by removing the paint nozzle, screwing on a back-firing attachment and filling the container with a 50-50 mixture of kerosene and gasoline.

Science News Letter, January 10, 1948

⚙️ **MECHANICS'** level measures the degree of slope of a bridge strut or a roof rafter. Made of aluminum and usable on all four surfaces, the 16-inch level has a central dial marked in degrees and a needle that remains vertical, thus indicating the slope. It has two horizontal and two vertical spirit vials.

Science News Letter, January 10, 1948

⚙️ **KNIFE SHARPENER**, shown in the picture, has plastic wheels that will not injure a kitchen table surface. The center part of the spool-like device is a grinding stone between which and the plastic wheel the knife is inserted. A pull-push



motion of the knife rotates the spool, putting a keen edge on the blade.

Science News Letter, January 10, 1948

⚙️ **LIVE LOBSTER PACKAGE** permits them to be flown from coast to coast in perfect condition. It is an insulated boxwood carton which controls temperature of the lobsters in transit, and a bag-type plastic liner to retain moisture of the seaweed in which the crustaceans are packed.

Science News Letter, January 10, 1948

⚙️ **TRUCK TIRE EXPANDER**, just patented, consists of a light-weight lever

carrying a sleeve which is worked forward by means of a handle and a ratchet device. Lever and sleeve have downward projecting, hook-like, tire-engaging arms which spread the tire as the sleeve advances.

Science News Letter, January 10, 1948

⚙️ **ELECTRIC FISH SCREEN** unit, a portable type suitable for the average farm pond, consists of a new type electronic generator used in conjunction with a free-swinging electrode system. The generator produces a series of mild, harmless underwater shock waves which keep fish away from outlets.

Science News Letter, January 10, 1948

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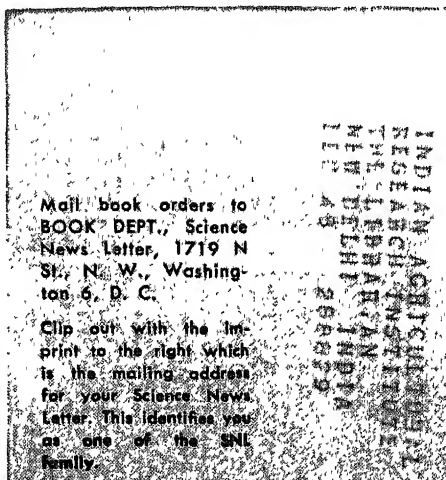
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Photographs: Cover, Dept. of Commerce; p. 23, Bakelite Corp.

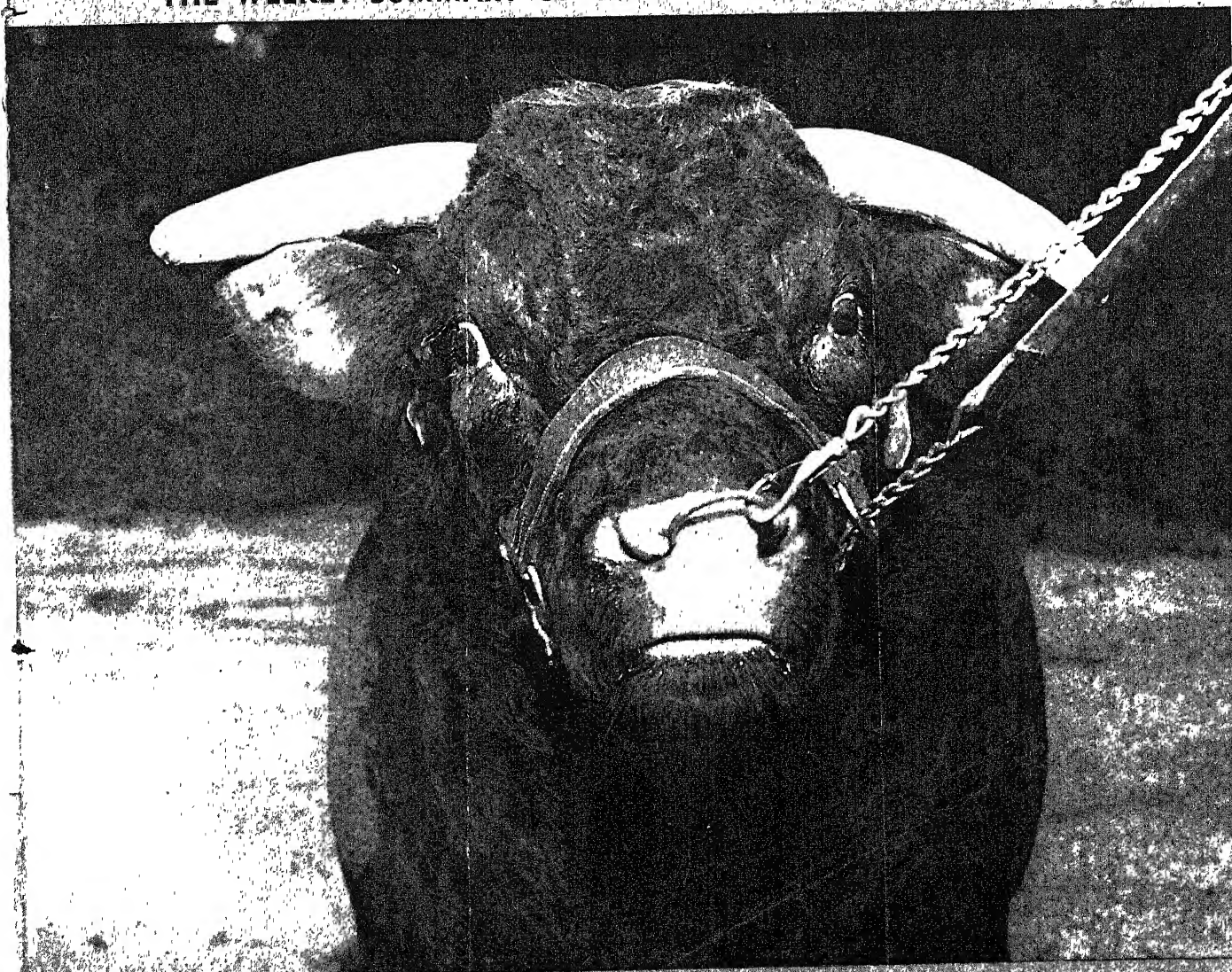


SCIENCE NEWS LETTER

Vol. 53, No. 3

11 MAR 1948

THE WEEKLY SUMMARY OF CURRENT SCIENCE • JAN. 17, 1948



Better Beefsteaks Ahead

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A SCIENCE SERVICE PUBLICATION



WHAT KIND of men are the 2,300 scientists and engineers of Bell Telephone Laboratories?

Men of many types, working in different fields of research, may contribute to each development.

But all have certain characteristics in common: Good minds as a foundation, many years of learning in the fundamentals of their science and the methods of research, and a co-operative attitude — for without co-operation of individuals these products of research could never be produced.

Above all else, however, they have “the spirit to adventure, the wit to question, and the wisdom to accept and use.”

That kind of men can produce the finest telephone equipment in the world — and have done so.



BELL TELEPHONE LABORATORIES EXPLORING AND INVENTING, DEVISING
AND PERFECTING FOR CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE

MEDICINE

Atom Bomb Defense

Rutin may save future radiation victims by strengthening the walls of their blood vessels to prevent hemorrhages.

➤ A POTENTIAL medical weapon against the atom bomb has been discovered by Drs. Paul E. Rekers and John B. Field of the Atomic Energy Project at the University of Rochester.

Rutin, obtained as a bright yellow powder from the green buckwheat plant among other sources, is the weapon.

It might save future atom bomb victims who were not killed outright by strengthening the walls of their blood vessels.

Uncontrollable bleeding, with oozing of blood into practically every organ and tissue of the body, is a primary factor in the deaths of humans and other mammals exposed to sublethal and midlethal doses of total body irradiation.

Such hemorrhages killed a considerable number of persons within three to five weeks after the atom bombing of Hiroshima and Nagasaki. The hemorrhages were ascribed to lack of certain elements in the blood necessary for clotting. This was due to radiation damage to certain cells of the bone marrow. An increased quantity of heparin, anti-clotting chemical, or of heparin-like material, has recently been observed in dogs following acute whole body exposure to ionizing radiation such as that from the atom bomb.

Strengthening the blood vessel walls might, the Rochester scientists thought, protect the body of an animal or man whose blood had too little clotting power as a result of radiation damage.

Tests reported in the journal, *Science* (Jan. 2), seem to show that their theory is right. They gave rutin three times a day for a week to 25 normal adult dogs. The dogs were then given a mid-lethal dose of X-rays. They continued to get rutin throughout the test. Only three of the rutin-treated dogs died, whereas 16 of 25 untreated dogs died after the same X-ray dose.

Both groups of dogs had the same post-X-ray depression of blood elements, especially white blood cells and thrombocytes. The latter are involved in blood clotting. In several of the rutin-treated dogs, this decrease in white blood cells and thrombocytes was severe and lasted 10 to 14 days. But they eventually recov-

ered. Recovery from such severe and lasting depression of these blood elements, the scientists state, has rarely been seen in their laboratory.

Science News Letter, January 17, 1948

VETERINARY MEDICINE

Sleepy Sickness in Dogs Mistaken for Distemper

➤ A WARNING to dog owners to watch out for signs of so called sleeping sickness, or encephalitis, in their pets was issued by the American Veterinary Medical Association.

The disease may be responsible for a great many of the dog losses hereto-

fore attributed to distemper. It is caused by a virus that affects the brain and nervous system. Distemper is also caused by a virus, and the symptoms are similar. But treatment for the two diseases is different.

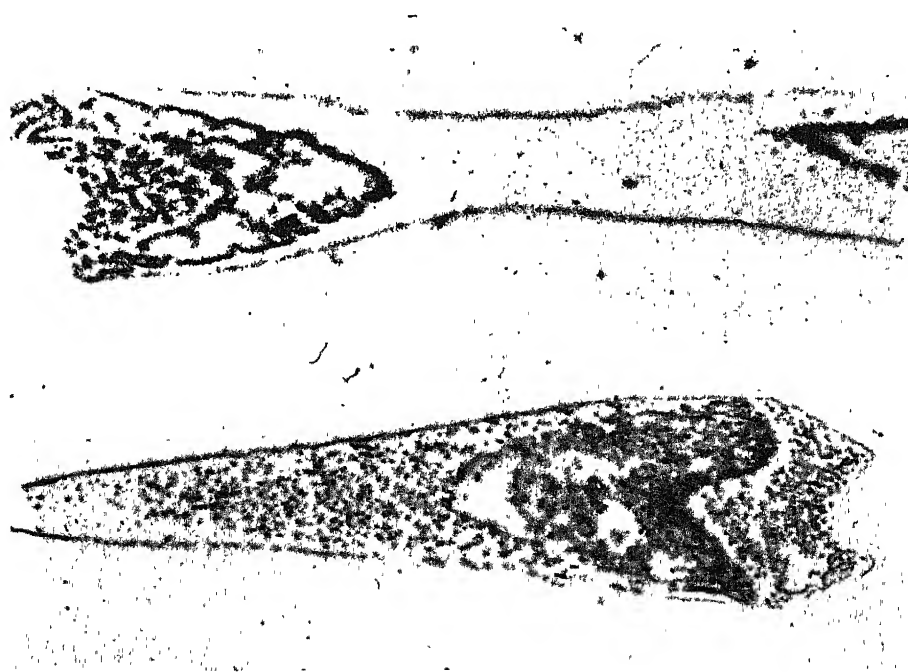
Anti-encephalitis serum is effective treatment in the early stages of the disease. Vaccination to prevent the disease is "still in the experimental stage," the association stated.

Encephalitis has been found in specimens from widely scattered sections of the country and is believed, on the basis of recent research, to be much more prevalent than heretofore realized.

More than 500 dogs in a single city, St. Cloud, Minn., have been stricken by the disease and a special veterinary research project has been set up to seek methods of controlling the outbreak.

An attack of encephalitis usually begins with violent convulsions followed by a lethargy in which the dog appears to be "walking in its sleep." Then these symptoms occur alternately. The death rate ranges from 20% to 75%.

Science News Letter, January 17, 1948



BIOLOGICAL ACTION OF ELEMENTS—Seeking ways to protect atomic workers from radioactive elements that might get into their bodies, Dr. Joseph G. Hamilton, University of California, injected the same elements into laboratory rats, then made these radioautographs of slices of rat bone, each one two-hundred-thousandth of an inch thick. They show the highly radioactive elements deposited in a thin layer of tissue, called the osteoid matrix, adjacent to the bone marrow cavity. Americium (lower), but not plutonium (upper) is also deposited in the region of small blood vessels that pass through the bone itself.

Linlithgow Library.

... ..

MEDICINE

Chronic Illness Increases

It poses a major challenge to doctors since seven out of every 10 deaths in New York state alone are due to long-term illness, says A.M.A. president.

➤ CHRONIC, or long-term, illness is one of the major challenges to the medical profession today, Dr. Edward L. Bortz, of Philadelphia, president of the American Medical Association, declared at the association's meeting in Cleveland.

The most common causes of long-term illness in the United States are: blood vessel disorders; chronic heart disease, high blood pressure, apoplexy, coronary occlusion; mental disorders; tuberculosis; cancer; diabetes; stomach and intestinal disturbances; anemias and other blood disorders; chronic alcoholism; genito-urinary disturbances including prostate gland disease; orthopedic (bone and joint) disorders; allergic states and disturbances of special senses producing deaf-mutism, hardness of hearing and lessening or total loss of vision.

Seven out of every 10 deaths in New York state are due to chronic illness, according to estimates, and over 70% of all disability results from it.

The problem of chronic illness is greater since effective remedies are being applied for many of the acute illnesses, such as infections, gland disorders and diet deficiencies. The fact that cancer is being diagnosed earlier and more cancer-threatened lives are being saved also adds to the number of those with chronic illnesses.

Old age, however, is not synonymous with chronic illness, Dr. Bortz emphasized. No age is immune to it and over 40% of patients suffering from some form of chronic illness are under 45 years.

"Long-range planning on a state-wide basis is essential," Dr. Bortz declared. "Medical authorities, with governmental officials and social workers should institute a state-wide survey in those states which have not yet developed a program. Classification is important. The basic approach to handling these patients should be preventive and prophylactic in character. For patients who have received maximum hospital benefits, custodial care either in homes or special institutions should be developed. Basic research, especially for degenerative conditions such as vascular and arthritic disorders, is uppermost in importance. Re-

searches in other phases of long-term illness need likewise to be greatly extended."

Mental Upsets Cut Output

➤ THE industrial worker who is mentally upset can do more to keep down production than a worker with heart trouble or other organic disease who is placed in a suitable job, Dr. Harold M. Harrison, medical director of George Weston, Ltd., Toronto, declared at the meeting.

Pride in workmanship and sense of achievement have been taken from many workers by technical developments that make them just tenders of machines, not mechanics. A feeling of inferiority which Dr. Harrison thinks is having serious repercussions on our community life has resulted.

To remedy the situation and help the mentally upset in industry, large companies should have psychiatrists on their staffs, while the company physician for small concerns will have to learn more of this branch of medicine.

Science News Letter, January 17, 1948

PHYSICAL MEDICINE

50 Miracles Accomplished With VA Rehabilitation

➤ FIFTY miracles, as they would have been called in an earlier age, were reported by Dr. Donald A. Covalt, of New York University College of Medicine, at the American Medical Association's congress on industrial health in Cleveland.

The twentieth century miracles went further than making the lame walk. They consisted in getting 50 men, World War I veterans over 50 years old, victims of strokes, broken backs and other conditions, out of the beds where they had been confined as helpless patients for 10 years, back home, walking, feeding and dressing themselves and working part or full time.

The miracles were accomplished in nine months by the methods of physical medicine and rehabilitation established in the Veterans Administration just two years ago.

Besides their value in terms of human happiness, the 50 miracles saved the government over \$1,000,000, Dr. Covalt estimates. The saving is based on the hospitalization cost of \$12 per day for each of the 50 patients, each of whom could be expected to live at least six more years. In addition to this saving, these men are now wage earners and taxpayers. And they are just a few, he indicated, of the many from two wars whom VA's rehabilitation service is returning to normal life and jobs.

Science News Letter, January 17, 1948

One rocket, to give additional power at take-off to heavily loaded planes uses as fuel mixed nitric acid, sulfuric acid and monoethylaniline.

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ENGINEERING

Fireless Blasting Methods For Coal Protect Miners

➤ FIRELESS, sparkless blasts of compressed air are jarring loose coal in one of America's newest and safest mines. The mine is the New Kathleen mine near Du Quoin, Ill., where more than a million tons of coal a year will be mined with modern safety and efficiency.

In addition to the air blasting, other safety features of the mine include a slope entrance instead of a vertical shaft with a hoist, conveyor belts to carry coal to the tippie and spraying both with rock dust on the walls and ceiling and water during some of the operations to cut down the dust.

Air blasting without fire is more expensive but reduces the possibility of explosions and is less likely to result in cave-ins than conventional blasting powder operations, mine officials declare.

Most of the mining processes use electricity in this mine which is owned and operated by a subsidiary of the Union Electric Company of Missouri. The new \$2,000,000 mine was put into operation this summer in the same Illinois coal field as the original Kathleen mine, which closed down in 1946 after 30 years of operation.

A water spray plays on the coal as bits on a revolving chain cut under the coal. Machines with two drills instead of the conventional one, carve out holes in the coal wall. These holes are sprayed with oil solution to reduce the dust before blasting.

Into these holes goes an airdox shell with a copper tube trailing back to a safe distance from the blasting. Air at a pressure of 10,000 pounds per square inch is shot into the shell through the tube. At a safe distance the operator releases the charge of air at high pressure into the holes.

There is no fire or blast powder, but the rush of compressed air breaks down an average fall of 35 tons of coal. A miner with a safety lamp inspects each fall to detect any methane gas present, but none has been found in the new mine.

After the coal is broken down by the air blast, an electrical car with heavy metal arms scoops in the coal and carries it to the conveyor belt where it is dumped for the ride to the high tippie. At the tippie, small bits of coal are sorted out for use in steam electric plants of the Union Electric Company. Larger coal is sold commercially.

Science News Letter, January 17, 1948



AIR BLASTING—A new safety feature in mines is this modern air-blast shell which a miner is inserting into a wall of coal. The air shoots into the shell through the copper tube which leads back a safe distance from the site of the blast and will send about 35 tons of coal crashing out of the vein.

OPHTHALMOLOGY

Improve Cataract Surgery

New procedure of cauterizing the leaking area after a cataract has been removed may hasten patient's recovery and increase chances of good vision.

➤ A NEW surgical treatment to stop "leaks" after cataract operations was reported by Dr. Victor A. Byrnes of the Aviation School of Medicine, Randolph Field, Tex., at the third Pan American Congress of Ophthalmology in Havana.

Cases in which the new procedure would help are those in which the fluid filling the front part of the eye leaks out or does not refill the space after the cataracts have been removed. The cornea is left flat against the iris in such cases.

To remedy this, Dr. Byrnes reopens the wound and cauterizes the leaking area. In two of the five cases reported slightly more complicated procedures were used. One 84-year-old woman had to undergo three operations before her eye returned to normal.

Dr. Byrnes emphasized that the procedure had been tried in only a few

cases, but his experience indicated that the patient's recovery was hastened, his comfort was increased and the chance of securing good vision was improved. He expressed the hope that others would try his method so that its value might be determined.

Altitude Affects Eyesight

➤ HIGH altitudes affect eyesight even among permanent inhabitants of mountain regions who have become acclimated to the oxygen-scarce air, it appears from a report by Dr. Jorge Valdeavellano of Lima, Peru.

A fifth of the persons he examined who lived in a town slightly above 15,000 feet in the Andes had only two-thirds the normal visual acuity.

There was no apparent reason for the

deficiency in eyesight and none of the persons mentioned having any difficulty in their work because of their lesser capacity to see. Many were surprised to learn they had such a handicap.

Dr. Valdeavellano's studies are believed to be the first made on the effect of high altitude on permanent residents although a number have been made in persons suffering from acute lack of oxygen in connection with aviation health problems.

The field of vision was reduced in a few of the mountain dwellers and practically all of them had enlarged blood vessels in the eyes.

Color discrimination was apparently not affected, since the percentage of Andean inhabitants with deficient color vision was about the same as in Lima. "After-images" (visual impressions lasting after the actual image has disappeared) were delayed in appearing and lasted longer in more than half of those examined.

Although some investigators have found an elevated tension, or pressure, within the eye during research on effects

of altitude, the tension in these Peruvian residents of mountainous areas was within normal limits.

Worms Invade Eyes

➤ SEEING worms before the eyes is a reality and not an alcoholic or other hallucination for patients with the tropical disease, onchocercosis.

The worms are in the eyes and seeing them is one symptom peculiar to the disease, Dr. M. Puig Solanes reported.

Onchocercosis is an infection caused by one of the species of threadlike worms known as filariae. It occurs only in Mexico and Guatemala in the Western Hemisphere, and in two-thirds of the cases the worms invade the eyes.

The worms look like black or colored threads moving about in the visual field, the patients say. The eye specialist can see them, too, when he looks through the electric ophthalmoscope to examine the eyes.

There is no specific treatment for the eye manifestations, Dr. Puig Solanes said.

Science News Letter, January 17, 1948

Navy Doctors Join Safari

They will go along with the University of California African Expedition to study native tropical diseases and protect other scientists.

➤ MICROSCOPES will supplement rifles on the new sort of safari expected to be undertaken soon by Naval medical scientists. When contract negotiations now pending are completed the scientists will accompany the University of California African Expedition, which proposes to turn the light of scientific research on the darkest continent.

The Navy medical group, latest planning to join the African Expedition, will have a two-fold duty. First, it will provide medical service to the top paleontological and anthropological scientists who, under the sponsorship of the University of California, will cover most of Africa this year seeking traces of primitive man and apes.

Second, the Navy, already well-known for its research in tropical diseases, will study such native diseases as African sleeping sickness, Bilharzia or snail fever, plague, scrub typhus, yellow fever and malaria. There are also a host of parasites in human beings concerning

which the Navy scientists are exceedingly curious, such as the particular form of hookworm in Mozambique, Portuguese East Africa.

To pursue their studies of these diseases, the Navy medical group will have to trap and shoot animals which are disease carriers. Among these are the rodents which are known carriers of bubonic plague; the zebras which are attacked by ticks and may carry relapsing fever; the deer, gazelles, eland, and possibly lions, tigers and leopards thought to be reservoirs of African sleeping sickness; and a large group of insect-eaters such as the shrew which may be a carrier of plague and malaria.

Most of these animals have not been used in research by American medical scientists before because animals which are potential disease carriers are not allowed to be imported. If they should escape captivity they might introduce a whole new series of diseases into the United States.

There are particular regulations against the fruit bat, a known malaria carrier, which if once established here would destroy citrus fruits. This fruit bat, however, is highly regarded by medical scientists as a good laboratory animal because it is easily raised in captivity. It may be that certain phases of the malaria cycle, not yet entirely understood, could be worked out through study of it.

The leader of the Navy group, Comdr. Julius M. Amberson, USNR (MC), says his party will not take restricted game such as the gorilla, elephant or giraffe unless necessary. They are more interested in small game concerning which there is less scientific knowledge.

All information discovered will be made available to research and public health authorities in Africa, and their respective governments.

Among the more interesting sections to be visited by the medical scientists are the Nubian desert, which has not been studied by a scientific group for over 100 years, the Sudan proper and the great central lake regions of Africa.

Assisting Comdr. Amberson will be Dr. Ernst Schwarz, zoologist and an authority on African mammals; Comdr. Trenton Ruebusch, University of Virginia parasitologist; and Capt. Harry Hoogstaal, former Army medical officer and entomologist from Chicago's Field Museum.

Science News Letter, January 17, 1948

AGRICULTURE

Spent Brewery Hops Form Good Mulch for Plants

➤ WASTE hops from breweries can be used to protect valuable plants from weather, weeds and fire.

Used as a mulch on the famed plants of the Arnold Arboretum of Harvard University, the spent hops were found to be a better protecting material than leaves, hay or straw which are commonly used. These mulches may be set on fire by a carelessly discarded cigarette. The waste hops, even when dried out, do not blaze up, and a flame will quickly go out unless exposed to other material.

Many mulches have been tried to protect the plants for the Arnold collection from this hazard. Some of the materials include wood shavings mixed with horse manure, ground coconut hulls, vermiculite, buckwheat hulls, ground banana stalks, peat moss and glass fibers. But the beer byproduct is the best one yet found.

For parks and other large, open areas where plants need to be protected, the spent hops may solve an important problem, but in your own garden, you will probably want to continue using leaves

or straw. The hops have a disagreeable odor which gradually disappears in large open areas, but might be less attractive in a small, compact home garden.

Science News Letter, January 17, 1948

PLANT PATHOLOGY

Test for Plant Diseases

A brilliant red color develops when certain virus-infected leaves are treated with an alkaline solution. May also prove useful as tool for study.

➤ A QUICK chemical test for some virus diseases of plants has been developed by Dr. R. C. Lindner, plant pathologist of the State College of Washington, at the Tree Fruit Branch Experiment Station at Wenatchee.

The test depends on a brilliant red coloration that develops when certain virus-infected peach or sweet cherry leaves are treated with an alkaline solution.

The test should be of great aid in establishing virus-free sources of plant material for propagation purposes, Dr. Lindner points out in his report to the journal, *Science* (Jan. 2).

It should give material aid in diagnosing some cases where symptoms are few and not typical, and might also be useful as a tool for study.

Ring spot, mottle leaf, rasp leaf, rusty mottle, twisted leaf and little cherry diseases of sweet cherry trees and cherry rusty mottle, western X-disease and little peach diseases of peach trees have been detected by the test.

Virus diseases of apples, apricots, raspberries, strawberries and blueberries can probably also be detected by the test.

To make the test, a disk is punched out of the middle of a leaf with an ordinary paper punch. The leaf disk is put in a test tube with a solution of sodium hydroxide, copper sulfate and sodium citrate. The tube is heated in a boiling water bath for five to 10 minutes, allowed to cool for 10 minutes and then shaken thoroughly. Normal leaves give a blue-green color, those from plants infected with certain viruses give a red color of varying intensities. The differences can be detected by the eye alone, but for accurate work, they are measured in a photoelectric colorimeter.

The chemical that gives the color has not yet been identified but is believed to be a tannin.

Girdling is the only factor known at

present to interfere with the test. Leaves from a girdled branch of virus-free trees give a red color like that of virus-infected leaves.

Science News Letter, January 17, 1948

TECHNOLOGY

New Machine Washes Eggs Quickly without Injury

➤ THE 500-bird poultry farmer, or the big poultry man, need no longer wash his eggs by hand. A new machine developed in Ithaca, N. Y., under the direction of Prof. Forrest B. Wright of Cornell University, will do the job five times as fast and without any injury to the eggs.

In the new machine, which in ap-

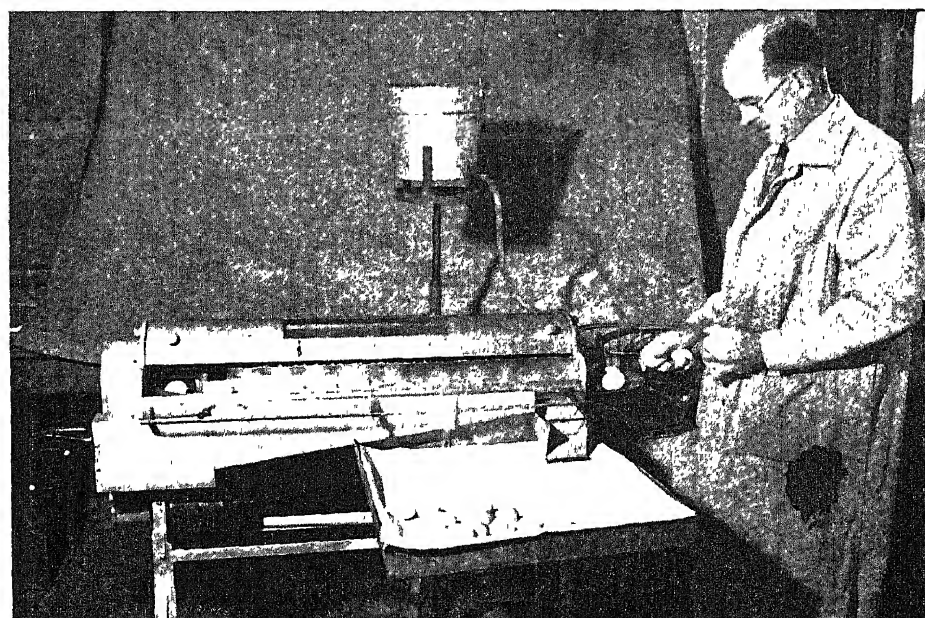
pearance resembles a horizontal cylinder some three feet long, the eggs are passed in a continuous stream and are flushed for 22 seconds in hot water at a temperature of from 165 to 170 degrees Fahrenheit. The water is supplied through a perforated pipe which extends out over revolving, abrasive-coated, cloth disks. The hot water softens the dirt; the scouring action of the disks removes it. The debris is carried away with the waste water.

The eggs are held against the pressure of the disks by two plastic rollers. These rollers also spin the eggs, causing them to turn on their short axes so that the ends of the eggs are cleaned as well as the rest.

The exposure of the eggs to the hot water for the short interval of 22 seconds has no effect on the matter inside the shell. After washing, the eggs are rolled over toweling to remove moisture, then quickly dried in a blast of hot air.

Dirty eggs washed in cold water will not keep as well as unwashed eggs, but those washed in this machine will keep in storage better than dirty eggs cleaned by any other method tested by the college. The machine removes very little of the natural "bloom" from the egg shells, and it can handle thin-shelled eggs without breakage.

Science News Letter, January 17, 1948



EGG WASHER—Without damaging even thin-shelled eggs, this new machine can clean a continuous stream of eggs. Hot water, supplied through a perforated pipe, softens the dirt, the scouring action of the cloth disks removes it and the debris is carried away with the waste water.

GENERAL SCIENCE

Scientists to Explore Primitive Australian Area

➤ ARNHEM Land, a primitive region on the north coast of Australia, will be explored by a party of American and Australian scientists, beginning at the close of the rainy season in March. The two-nation party of scientists will study the stone age savages of the little-known area and its animal and plant life.

Four of the expedition's five bases will be at Christian missions at the heads of navigation of mainland streams, while the other base will be on Groote Eylandt (Big Island) off the coast.

Arnhem Land, about the size of the state of Maine, was discovered by the Dutch and named for the yacht of early explorers. It is east of Darwin, on Australia's north coast. The aboriginal inhabitants long held a savage reputation as cannibals, and they are still considered difficult to approach. Natives will, however, be used as porters for trips inland.

The expedition will land in Arnhem Land from a small schooner which will carry the party to coastal stations on Van Diemen Gulf, the Arafura Sea and the Gulf of Carpentaria.

Charles Percy Mountford, ethnologist of the South Australia Museum, Adelaide, will be leader of the expedition, which is sponsored jointly by the Smithsonian Institution, the National Geographic Society and the Commonwealth of Australia. American scientists from the Smithsonian Institution who will be in the party include: Frank M. Setzler, head curator, department of anthropology; Dr. David H. Johnson, associate curator, division of mammals; Herbert G. Deignan, associate curator, division of birds; and Dr. Robert R. Miller, associate curator, division of fishes.

Science News Letter, January 17, 1948

GENERAL SCIENCE

Indian Scientists Doing Important Research Work

➤ NOT only politically, but also in the scientific field, India has reached maturity. A visit to the Royal Institute of Science at Bombay shows that Indian scientists have much to contribute to international science.

Quite young as scientific institutions go—the Royal Institute of Science celebrated its Silver Jubilee only two years ago—it has already left its mark upon

the scientific life of India and some of its alumni are world famous. Enough to mention Prof. H. J. Bhabha (now head of the Tata Institute of Fundamental Research, Bombay) of cosmic ray fame; Prof. V. V. Narlikar (now head of the department of mathematics, Benares University) known for his work on relativity.

The Principal of the Science Institute, Prof. Mata Prasad, has done outstanding work in colloid and magneto-chemistry and, together with a group of energetic research students, is continuing to investigate the preparation and the formation of gels, more particularly soap gels in non-aqueous media.

In organic chemistry, Prof. R. C. Shah is covering a wide field, including the chemistry of coumarins and chromones, derivatives of salicylic acid and new method of preparation of saccharin and chloramine-T.

In the department of inorganic chemistry, researches have been carried out by S. M. Mehta and his students on alkaline earth sulphates, amphoteric oxides, boric acid and upon the recovery of titania from bauxite.

In the physics department, work is in progress on the scattering of light by dust and smoke particles, on dipole moments, on the fluorescence of synthetic materials. Dr. N. R. Tawde, professor of physics, is working on the spectra of flames of hydrocarbons.

Equally important work is being carried out in the departments of botany and zoology of the Institute.

Science News Letter, January 17, 1948

ENTOMOLOGY

Tobacco with 10% Nicotine Used to Kill Insects

➤ FINELY - GROUND tobacco so strong in nicotine that not even the most confirmed snuff addict would ever dip or chew it—not more than once, anyway—has been patented as a possibly profitable commodity. Intended for poisoning insects, it has had its natural nicotine content stepped up to 10% by the addition of straight nicotine sulfate. The pulverized leaf and stem tissue serves as an efficient and low-cost carrier, in place of the mineral dusts hitherto employed.

The inventor of this new natural insecticide, Robert B. Arnold of Richmond, Va., has assigned rights in his patent, No. 2,431,672, to the Tobacco By-Products and Chemical Corporation.

Science News Letter, January 17, 1948



ENGINEERING

Heating Costs Reduced by Mixing Sizes of Coal

➤ HOME HEATING costs may be reduced where anthracite is used for fuel by using in connection with the ordinary egg or stove coal some of the pea, buckwheat and rice sizes, James Boyd, director of the U. S. Bureau of Mines, said.

These small sizes are plentiful, cost less than the larger, and have a heating value almost equal to that of egg, stove and chestnut sizes, he declared. For the best results, the larger and the smaller sizes should be burned in alternate layers. The layer method is particularly advantageous in banking or mild weather firing because the percentage of the smaller sizes can be increased at these times, thus producing a slower burning fire which will last much longer before refueling is necessary.

Science News Letter, January 17, 1948

PHYSIOLOGY

Sex Influences Man Less Than Lower Animals

➤ MAN differs from mice in being less influenced by sex and body chemistry and more by love in his courtship and mating.

But no vertebrate animal is exclusively controlled by physical factors in finding a mate and raising its young, Prof. Frank A. Beach, psychologist of Yale University, reports in a new book published by Paul B. Hoeber, "Hormones and Behavior." Studies of sex behavior are reported not only for man and the higher animals but also for other creatures much more distant on the evolutionary scale, such as fish, frogs, snakes and even paramecia.

As we go up in the evolutionary scale, Prof. Beach says, the relative importance of the hormones and body chemistry becomes less and less important and psychological factors more and more evident.

The chimpanzee is most like man of all the animals—so much so that over-sexed animals, masturbation, "rape" and even "prostitution" have been observed in these closest of man's relatives.

Science News Letter, January 17, 1948

THE FIELDS

MEDICINE

Epidemic Nausea Now Called Virus X Disease

➤ IF you and each member of your family have one after another had a sudden attack of nausea and vomiting which laid you low for 24 to 48 hours, you were probably suffering from epidemic nausea.

This apparently new disease, recently christened virus X disease in Los Angeles, is not so new to doctors who have been seeing cases for the past several winters. It is believed to be caused by a virus, but the virus has never been isolated and therefore got the name X, for unknown.

The majority of the cases of illness in Los Angeles are probably due to the common cold and epidemic nausea, Dr. Wilton L. Halverson, director of public health, reported in answer to a Science Service inquiry.

Blood tests have shown the presence of influenza virus A in the southern California area, he stated. Virus isolations from nose and throat washings have been suggestive but thus far not conclusive for virus A.

So probably the hundreds of thousands of cases, according to unofficial reports, of a mysterious disease were made up of some cases of the 'flu plus many bad colds plus attacks of epidemic nausea. Between them, the illnesses have caused 20% school absenteeism, the state health officer reported to the U. S. Public Health Service.

No work on virus X disease has been done at the Hooper Foundation, famed for its virus researches, at the University of California School of Medicine in San Francisco.

Science News Letter, January 17, 1948

AERONAUTICS

Wind Tunnel Duplicates Upper Atmosphere Pressure

➤ A TINY wind tunnel at the University of California at Berkeley is said to be the world's first low pressure type to duplicate actual pressure conditions up to an altitude of over 45 miles.

It is a model with a test section only

one inch square. Its purpose is to test design features for a 10-inch square operating tunnel now under construction. With this larger tunnel, scientists will be able to explore for the first time a wide belt in the upper atmosphere, extending up perhaps to 300,000 feet.

The principal object of this tunnel is to develop precise information on the fluid mechanics of supersonic speeds in extreme altitudes. These are speeds faster than the velocity with which sound travels. The first application of the information gained will be in the fields of guided missiles, rockets and airplanes.

There are already several supersonic wind tunnels in use in the United States but they blow air over models of rockets and airplanes at high pressures. They do not necessarily give a true picture of what happens to a missile, rocket or airplane traveling at supersonic speeds in the rarified atmosphere and low temperature at altitudes 10 miles or more above the earth.

Science News Letter, January 17, 1948

PSYCHOLOGY

Twins Over 60 Studied For Problems of Aging

➤ WANTED! Twins, over 60 years old, residents of New York, to help scientists discover the social and psychological factors needed to preserve physical and mental health in old age.

Dr. Franz J. Kallmann of the New York State Psychiatric Institute at Columbia-Presbyterian Medical Center may not actually have run such a want ad, but he says he still needs more twins.

The study is the first of its kind ever attempted. With a \$31,500 grant from the Rockefeller Foundation, renewal of an original gift made in 1945, the study will continue for three more years.

The present number of aging twins available for continuous observation totals more than 1,500 persons. Their ages range from 60 to 94 years. They include more than 500 pairs of whom both members are still alive and actively co-operating by providing life histories and the extent of their activities in aging years.

Analysis of these data, Dr. Kallmann says, will give a valuable opportunity to study life histories of twins in relation to the many problems of aging and longevity and the mental health aspects of marital adjustment, mate selection and the effect of working habits.

Science News Letter, January 17, 1948

GEOPHYSICS

Warns Quakes May Damage St. Lawrence Waterway

➤ A WARNING that earthquakes may endanger part of the proposed St. Lawrence Waterway was issued in Ottawa by an engineering geologist.

Dr. Charles P. Berkey of Columbia University reported to the Geological Society of America that the strong Massena-Cornwall earthquake in September, 1944, "covered precisely those portions of the St. Lawrence River and side country which would be occupied by the principal works of the St. Lawrence Waterway development as proposed by the U. S. Engineers."

The scientist, who made a study of the area immediately after the quake, predicted that the greatest danger would be to the main canal. This would be built on loose sands and silt where a tremor does the most harm, Dr. Berkey said. Dams, locks and power house, built on a sound rock foundation, would not have been damaged by the quake of three years ago. He recommended "special handling" in the building of the canal and other structures on the loose ground area of the waterway.

Dr. Berkey explained that the area between Massena, N. Y., and Montreal has a number of quake-making faults. The possibility of future disturbances should not be overlooked in planning the St. Lawrence development, he cautioned.

Science News Letter, January 17, 1948

Antibiotics May Aid Fight Against Plant Diseases

➤ ANTIBIOTICS, like penicillin and streptomycin, not only kill germs attacking human beings and animals; they can be put to good use against plant diseases as well. Profs. Curt Leben and G. W. Keitt of the University of Wisconsin told of using a still unidentified substance extracted from *Streptomyces*, source of streptomycin, in completely controlling the difficult diseases known as apple scab and early blight of tomatoes. When the leaves of the plants being studied were sprinkled to simulate rain, the substance, whatever it was, was not washed off. We may yet see whole orchards sprayed with drugs that we now think of as usable only in hospitals and sickrooms.

Science News Letter, January 17, 1948

GENETICS

Better Farm Animals Bred

Animal improvements will include unwrinkled sheep, cattle that can stand hot weather, leaner hogs and small turkeys with lots of white meat.

See Front Cover

➤ NEW model animals are being bred for future American farms in much the same way that automobile engineers already have the new cars of 1950 on their drawing boards.

Here are some of the animal improvements promised by animal geneticists of the U. S. Department of Agriculture:

Unwrinkled and smooth-faced sheep.

Cattle that thrive in hot climates.

Steers that make better beefsteaks.

Leaner hogs.

Chickens without great pin feathers.

Small, white-meated, family-size turkeys.

Sheep that don't have to be "shaved" mean savings in dollars. Open-faced Rambouillet ewes at the U. S. Sheep Experiment Station near Dubois, Idaho, weighed five pounds more after shearing than those that were wool-blind.

Sheep without the wool over their eyes can see to find food and water and are better able to keep out of trouble. They also have produced more than 10% more pounds of live lambs a year than woolly-faced ewes.

Finer Fur Coats

Finer fur coats will become available as scientists "press" wrinkled sheep. When the pelts are processed for mouton fur, the wrinkles don't come out but leave streaks. Scientists can breed the wrinkles out by crossing sheep without excess skin folds. This also pays in better wool, for the wool on the wrinkles is coarse. Wrinkled sheep are hard to shear, and often the wool gets bits of skin mixed with it—which is hard on the sheep as well as on the quality of the wool.

More beautiful Navaho Indian rugs will result from other scientific experiments in sheep breeding. Observation on the Southwestern Range and Sheep Breeding Laboratory at Fort Wingate, N. M., and on the Navajo reservation is leading toward development of the type of sheep best suited to Navaho needs. Results of this research work in crossbreeding are being applied on the Navajo

reservation as fast as conditions will permit.

One of the aims is a long-staple wool better suited to weaving and also to commercial uses. Demand for wool for Navaho weaving far exceeds the supply.

Fat hogs used to be the goal of hog raisers. Now they grow them lean. Vegetable fats have given lard such competition that lean pork gives more profit now. Another improvement in breeding is the development of hogs that are ready for market with the least amount of food.

Developing Best Strains

The Department of Agriculture's Research Center at Beltsville, Md., is crossbreeding with American strains until they get a line with the best characteristics. Then they will inbreed to stabilize these characteristics. One of Denmark's best strains is the Danish Landrace, which is being crossed with Duroc,

Hampshire, Yorkshire and Poland China hogs. The Landrace breed is white, and because of its thin skin it gets sunburned. So scientists have developed red and black strains of the Landrace. At Beltsville accurate records are kept on mothering ability, rate of gain and feed utilization.

Hybrid Hogs Are in Use

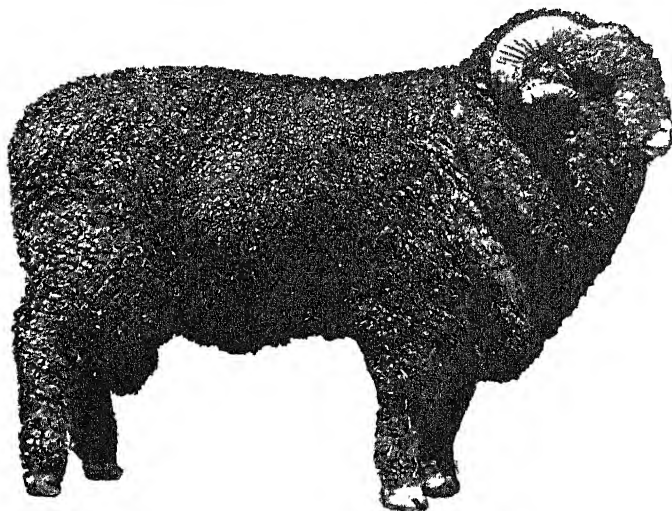
Hybrid hogs are already in use on American farms. Some of the boars of the new strains have been sold to hog breeders so that they can find out how good their hogs are. By mating some of the sows to the new boars they can compare the offspring to those produced by matings in the herd. These hog raisers are expected to keep records to send the Research Center, thus helping in the plan for breeding better hogs.

The bodies of hogs of the new strain are long, deep and smooth. The hams are wide and thick, and carry down well to the hock. The new strains average nine to ten pigs per litter.

Science is making cooler cows and better beefsteaks. Cattle can stand only small changes in their body tempera-



IRONING OUT THE WRINKLES—When the pelts of these sheep are processed for mouton fur the wrinkles leave streaks so scientists are crossbreeding them with smooth model sheep. This will also result in better wool since that on the wrinkles is coarse.



BETTER WOOL—This champion Merino ram demonstrates the success scientists have had in solving the problem of wrinkled sheep by cross-breeding.

ture of 101 degrees Fahrenheit. This would be hot enough for any man as well as for cattle, but the hot climate near the Gulf of Mexico taxes the animals' self-cooling systems. Zebu, Aberdeen-Angus, Africander, Hereford and shorthorn bulls were used in crossbreeding at the Iberia Livestock Experiment Station at Jeanerette, La. From one-fourth to one-half zebu blood is needed to make the animals better able to stand hot weather, scientists believe, though further research has yet to reveal just the proportion. Zebu cattle, the humpbacks from India, have better heat-regulating bodies than European cattle.

Superior Cooling System

An indication of the superior cooling system of zebras is their grazing habits. On hot days they continue grazing most of the day, while Angus cattle lie in the shade.

Better beefsteaks are designed to make everybody happy—those who can afford them, that is. Selective breeding plays an important part in insuring tender, juicy steaks. There are many characteristics that even experienced cattlemen cannot see in mating cattle. But some good characteristics can be bred into a line of cattle by selecting steers that are heavy when born, grow fast, and provide tender steaks when slaughtered.

Some of the things hard to judge are the ability of the steer to turn feed into flesh, the value of the animal when ready

for slaughter and the merit of the carcass. By studying eight or 10 offspring it is possible to judge the sire's value.

U. S. Department of Agriculture scientists are stressing the breeding of low-set, compact cattle as shown on the cover of this week's SCIENCE NEWS LETTER. However, the size should not be reduced too much by restricting length and height to get compactness.

Hybrid Vigor Studied

Corn hasn't any monopoly on hybrid vigor. Steers of shorthorn bulls mated to Hereford cows gained more rapidly than purebreds, were heavier at time of marketing and had fewer digestive disorders.

Further research, with carefully kept records, is necessary to tell how valuable crossbreeding is in producing better beef cattle.

Meanwhile poultry is not being neglected. Housewives will be able to buy chickens with fewer pin feathers to pull out. Fast-feathering chicks are the answer. Selective breeding has developed a strain of the new Columbian chicken that has well-developed tail and wing feathers. Higher quality meat and eggs, and more eggs are also objectives of poultry scientists at the Department's Beltsville Research Center.

The average hen on your father's farm laid 86 eggs a year. Now the average hen lays 118 eggs, and in some flocks the

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Do You Know?

Moose are powerful swimmers; so are mice.

Bed sheets made of paper may become common some day.

A rat may have six litters of young each year, with from six to 22 in each litter.

The iris is the source of *irone*, one of the most odoriferous substances for perfumes provided by nature.

The gas-turbine is particularly suitable for locomotives because it combines good thermal efficiency with freedom of water requirements.

Fire-fighting benefits by the use of organic chemicals which, mixed with the water used, give an increased extinguishing action of 200% to 400%.

A South American native plant known as *naranjilla*, botanically *Solanum quitoense*, yields a delicious and refreshing fruit juice; in shape, color and acidity the fruit is similar to the orange.

Highly concentrated hydrogen peroxide, used with calcium permanganate to launch Nazi V-1 bombs, may some day be used to operate small power plants where the factors of space and weight per horsepower are important.

Doorbell that automatically gives different signals when the front door or rear door button is pushed lets the housewife know immediately at which door her visitor is.

number is twice that. Good feeding and sanitation and selective breeding have made this record. A breeder mates birds that have superior egg-laying ability and can pass it on to their offspring.

Getting all-white meat in chickens is not worrying scientists, but producing more meat for every dollar spent on food is a problem of both scientists and of the farmers. It has been found that cross-breeds usually produce more meat for the amount of food than the purebred parents. Crossbred pullets and hens tend

to be broody oftener than purebreds.

The Beltsville Small White turkey, already on the market, is the answer to family needs. It is a relatively small bird, with lots of white meat. Several thousand have been produced and hatching eggs have been distributed to commercial breeders. The toms weigh 12 to 17 pounds alive at market age, and young hens weigh 7½ to 10 pounds, roughly about two-thirds the weight of mature standard-size birds.

Science News Letter, January 17, 1948

MEDICINE

Drugs Endanger Infant

Pain-relieving methidon, given during childbirth, has a depressing effect on the new-born baby's breathing. It is more powerful than morphine.

➤ DANGER to the new-born baby when its mother is given one of the new drugs for relieving pains during its birth is reported by Drs. Allan C. Barnes, Fred B. Hapke and John H. Holzaepfel of the College of Medicine at Ohio State University.

The drug, known variously as methidon, amidone, dolophine and 10820, was synthesized in Germany in 1939 and kept secret during the war. It is two to four times as powerful as morphine in relieving pain, but like morphine can probably cause addiction.

The danger of methidon for new-born babies comes through its depressing effect on breathing. When a certain size dose of methidon was given to the mother two hours or less before the baby's birth, there was a significant delay before the baby started to breathe and gave its first lusty cry. When a smaller dose, two-thirds the amount, of methidon was given, regardless of how short or long a time before the baby was born it had no significant effect on the baby's breathing.

Methidon, like other pain-relieving drugs, may not be the only drug given to a mother in childbirth. Combinations of drugs are often used to ease labor pains. The possibility that using methidon with other drugs may increase its harmful effect on the baby must be considered, the Ohio State doctors point out, though their studies give no information on this.

Almost equally important with the finding of methidon's danger, they think, is the method they devised for studying it. Each of the 25 women given methi-

don, and each of 30 not given it and studied as controls, was given either caudal or saddle block spinal anesthesia for the last few hours before the baby's birth.

This method makes possible the study of the effects of a single drug, such as methidon, on the baby's breathing because no other pain-relieving drug need be given the mother. No other study of the effects of a single drug on the new-born baby's breathing has been made, so far as reports going back to the year 1904 show.

Details of the current study are reported in the first issue of the *Health Center Journal*, (Dec.) new medical journal issued by Ohio State's College of Medicine and Dentistry.

Science News Letter, January 17, 1948

GENERAL SCIENCE

Books Pay Subscriptions To Polish Science Journal

➤ TO keep up with science in Poland you can receive *Zycie Nauki* (Life of Science), a monthly publication, which appears in Polish with a summary section in English. To the editors of this journal, books from abroad are more to be desired than cash for subscriptions. A recent issue (July-Aug., 1947) carries the message:

"We beg foreign subscribers not to send us cash but only their addresses, as it would be more convenient for us to receive foreign books in exchange. Their titles would be agreed to by later correspondence."

Science News Letter, January 17, 1948

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AGRICULTURE

India's Food Output Low

➤ INDIA'S great need is for more food in the face of a rapid increase in population. This is a predominant theme of the Indian Science Congress held at Patna, with scientists from all parts of India in attendance, regardless of political affiliations.

Indian food production could be increased by 30% if scientific methods of agriculture, artificial fertilizers, more irrigation and extermination of insect pests were applied, Prof. B. C. Guha, of Calcutta University, chief government adviser, told the Congress. He declared that India does not get a fair share of the world's food supply.

Manufacture of foodstuffs from the cellulose of wood and farm wastes was urged by several other scientists as a means of attempting to keep the food supply more adequate. Such methods were practiced successfully in Switzerland and Scandinavia during the war and as a result animals were fed on such synthetic foods, providing meat from raw materials that could not be used for human consumption.

Artificial insemination used in breeding Indian cattle promises important improvement in the quality of the herds

for both meat and milk, the veterinary section of the congress was told. In this method one bull of superior breeding can be the father of thousands of calves whose mothers he never sees.

But much opposition to this scientific procedure so successful in other world areas is reported among Indian farmers, because Mahatma Gandhi has made a pronouncement against artificial insemination for cows.

Plan Rainmaking in India

➤ ARTIFICIAL rain making at high altitudes will be tried in India during prolonged breaks in the monsoon, Dr. S. K. Banerjee, director general of the Indian Observatories, told the congress.

Spraying of clouds with dry ice will have to be done at a height of about 15,000 feet because the freezing level is higher in India than in the United States, where the rain making is done at lower altitudes.

Prof. Manuel Vallarta, Mexican delegate to the congress, advocated using V-2 rockets to investigate the proton origin of cosmic rays.

Science News Letter, January 17, 1948

CHEMISTRY

Insecticide List Growing

➤ NOW that the football season is over, and you've memorized the traditionally unpronounceable names of the All-American gridders, it's time to tackle another list of bizarre names. These are the chemical weapons you will hear about in the 1948 war on flies, rats and other pests of the animal kingdom.

DDT and its near-relative insecticide DDD are easy names because they are abbreviations for long chemical terms. But maybe "GIX" sounds like a breakfast food to you. Actually it is another chemical relative of DDT. GIX was claimed to be superior to DDT for farm use by the Germans, according to a report issued by the Office of Technical Services of the Department of Commerce.

U. S. Department of Agriculture scientists do not agree with the Germans. GIX uses fluorobenzene in place of monochlorobenzene of DDT and is

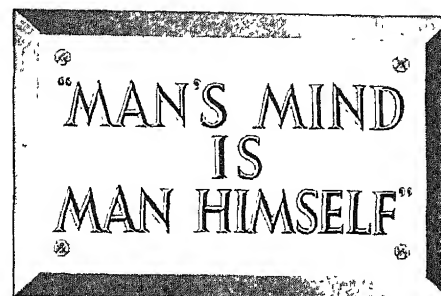
more expensive. And GIX is not as deadly to insects.

Other newly-added names to the growing list of chemical insect foes include "Parathion" and "Methoxychlor." Both of these are still under experiment. Parathion, which is also called thiophos 3422 or just plain 3422, may be important in orchards where mites survive DDT. Methoxychlor is the proposed name for another DDT-related chemical which boasts some promise against insects.

If you want to shop around in the laboratory for other insect-discouraging chemicals, here are a few of the newer ones which scientists are working with: chlordane, toxaphene, benzene hexachloride, piperonyl cyclohexenone, piperonyl butoxide and tetraethyl pyrophosphate.

Antu sounds like a place we chased the Japs out of in World War II. Actually it is a chemical to kill rats. Another death-on-rats is known as 1080.

Science News Letter, January 17, 1948



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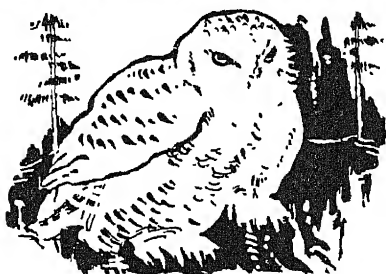
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Don't Shoot!

➤ **SHOOTING** at owls and hawks is a good deal like shooting at night watchmen and policemen—except that the owls and hawks can't shoot back. All they can do is die if hit, or leave the neighborhood if they escape our lead, thereby giving free entry to our valuables to thieves whose activities are normally held in check by their presence.

True, one or two species of hawks steal chickens occasionally. True also, owls are hated by other birds, which "gang up" on them whenever they find one by daylight in an exposed place. But to condemn the great majority of harmless and useful hawks for raids which they never commit, and to make common cause with bluejays and wrens against stray owls for their rather rare nest robberies, is simply an ignorant neglect of our own biological interests.

Predators, killers, owls and hawks undoubtedly are. But the prey that they kill consists overwhelmingly of small rodents and other creatures that we human beings commonly label as vermin. Owls without exception, and hawks with only two or three exceptions, are our allies, not our enemies.

They deserve our gratitude, not our gunfire.

Owls especially are valuable as flying mousetraps. They are active when the rodents are most likely to be abroad. Although, contrary to a widespread notion, they cannot see in the dark, they do see well enough to do highly effective hunting in the dim twilight of late evening and pre-dawn, and by the illumination shed by even a sliver of a moon. They are noiseless fliers, so that the rodent quarry has no warning of his impending doom until the sharp talons close on him.

Beginning now, and lasting until spring, is the time when the pressure

of owl and hawk hunting on the rodent populations is most effective, from the human point of view. Food supplies are shortest in the woods and fields, so that hunger drives many wild species to raids on our grain and other stores, to gnawing the bark of young orchard trees, and to many other destructive practices. At the same time, their numbers are at the lowest ebb of the year, for breeding is at a standstill with most species. Every potential mouse parent taken out now means one family fewer among our undesired dependents next year. Owls should therefore be left unmolested in their volunteer role of rodent control agents.

Science News Letter, January 17, 1948

ASTRONOMY

1947 Broke Comet Record

Fourteen were found during the year, nine of which were newly-discovered. Up until this time 1932, when 13 were spotted, was the big year for comet-seekers.

➤ "THE year 1947 was a record-breaking one for comet-seekers," according to Dr. Fred L. Whipple of Harvard College Observatory. Only one comet, seen by many in the southern hemisphere and reported to have broken in two as it became less bright, has been spectacular. But a large number have been visible with a telescope.

A total of 14 comets were found during 1947. This breaks all previous records for comet-finding. Up to this time the all-time record for one year was 13, the number spotted in 1932. Not only were more comets located this year, but the number of newly-discovered ones was greater. Nine of the 14 comets were new finds, five were comets that periodically return to the vicinity of the earth. In 1932 only eight comets were newly discovered.

One-third of the new comets, those visitors from space that remain visible for a few weeks or months then fade away, were spotted by M. J. Bester of Harvard's South African station. Two are known as Bester's comets, while the other bears the name of Rondonina-Bester. It was independently discovered by two people.

Two of the periodic comets visible this year, Faye and Grigg-Skjellerup, were also seen in 1932. Comet Schwassman-Wachmann, also seen both years, is never counted in totalling the number of comets spotted for it is eternally visible. Comet Oterma, another faint comet that never entirely disappears, was not discovered until several years ago.

Another record breaking year for discovering comets was 1927. In that year ten comets, the largest number up to that time, were reported: six were new and the rest periodic visitors on regular return trips. The record for 1947 beats that set 20 years ago both as to new comets and as to total number seen.

Beside the three comets named Bester, other comets discovered this year are: Becvar, Jakovin, Wirtanen, Reinmuth, Honda and 1947 N. This last, the bright new comet with the long tail has not been named for anyone as it is still not known who first found it from the ship in the Pacific.

Science News Letter, January 17, 1948

ANYONE CAN USE A SLIDE RULE

Absolutely no math background needed if you have the **PRACTICAL SLIDE RULE MANUAL** by J. M. Klock, formerly Mathematician for the U. S. Navy and instructor in the Detroit Public Evening Schools. An absolutely non-technical explanation of how to use a slide rule for the fundamental math calculations. **STUDENTS** of all math, science, and technical subjects will find the use of a slide rule to be a great aid in their work. **SHOP AND TECHNICIANS:** special applications made to formulae from mathematics, engineering, aeronautics, air navigation, etc. The slide rule gives rapid solutions to all the basic formulae. **OFFICE:** and business administration applications are numerous. The slide rule is especially valuable in per cent and interest work, and cost accounting. The booklet includes chapters on these subjects. The slide rule is also a valuable rapid estimator.

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Books of the Week

TO SERVE YOU: To get books, send us a check or money order to cover retail price. Address Book Dept., SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C. Ask for free publications direct from issuing organizations.

ATLAS OF BACTERIOLOGY—R. Cranston Low and T. C. Dodds—*Williams and Wilkins*, 168 illus., \$8.50. This book of beautifully colored illustrations is intended primarily for the medical undergraduate.

ENGLISH NATURALISTS FROM NECKAM TO RAY; A Study of the Making of the Modern World—Charles E. Raven—*Cambridge Univ.*, 379 p., \$6.50. A history of man's attitude toward the flora and fauna of his environment, illustrated by the lives of the men who contributed to the progressive change in Western civilization from the medieval to the modern world.

A HANDBOOK OF DESIGNS AND HOW TO USE THEM—Gordon de Lemos—*Educational Materials*, 118 p., illus., paper, \$2.50. For artists, craftsmen and students—designs covering subjects ranging from birds and flowers to abstract motifs.

HORMONES AND BEHAVIOR; a Survey of Interrelationships Between Endocrine Secretions and Patterns of Overt Response—Frank A. Beach—*Hoebner*, 368 p., \$6.50. A detailed study of the whole subject of hormonal activity in men and other animals. Includes an exhaustive bibliography.

HYPNOTHERAPY. a Survey of the Literature—Margaret Brenman and Merton M. Gill—*Int. Univ. Press*, Menninger Foundation Monograph Series No. 5, 276 p., \$4.50. An edition for the public of a monograph published in 1944 by Josiah Macy, Jr., Foundation, plus four case studies and a report on the use of hypnosis in experimental psychology investigation.

INTRODUCTION TO PHILOSOPHY OF EDUCATION—Stella Van Petten Henderson—*Univ. of Chicago Press*, 401 p., \$4.00. Textbook for the undergraduate preparing to teach, summarizing philosophy as a sound basis for educational practice.

MAN'S LAST CHOICE: a Survey of Political Creeds and Scientific Realities—E. M. Friedwald—*Viking*, 128 p., \$2.00. Unprecedented growth of science, the most potent single factor in the history of mankind, constitutes, the author believes, a challenge to political thought.

NUCLEAR PHYSICS IN PHOTOGRAPHS; Tracks of Charged Particles in Photographic Emulsions—C. F. Powell and G. P. S. Occhialini—*Oxford*, 124 p., illus., \$6.00. A photographic atlas with explanatory text including natural radioactivity, nuclear transmutations, as well as mesons.

THE PATENT SYSTEM—Law and Contemporary Problems, Vol. XII, No. 4—*Duke Univ.*, 162 p., paper, \$1.00. Symposium of eight papers covering various phases of this important subject.

PRACTICAL CHILD GUIDANCE AND MENTAL HYGIENE—Samuel Kahn, Grace Kirsten, May E. March—*Meador*, 285 p., \$4.00. This book attempts to answer some common questions on child care.

THE PRACTICE OF GROUP THERAPY—S. R. Slavson, ed.—*Int. Univ.*, 271 p., \$5.00. A comprehensive survey of the scope and

limitations of this new method of clinical treatment of various maladjustments such as allergies, neuroses, and speech disorders, as well as psychoses.

PRELIMINARY SURVEY OF THE AMPHIBIANS OF THE RIUKIU ISLANDS—Robert F. Inger—*Chicago Nat. History Museum*, Fieldiana: Zoology, Vol. 32, No. 5, 55 p., paper, 75 cents.

PROBLEMS OF ACCELERATING AIRCRAFT PRODUCTION DURING WORLD WAR II—Tom Lilley, Pearson Hunt, J. K. Butters, Frank F. Gilmore, Paul F. Lawler—*Harvard Univ. Grad. School of Bus. Adm.*, 112 p., paper, \$1.50. A plan for industrial preparedness in the aircraft industry, undertaken at request of War, Navy and Commerce Departments.

PROCEEDINGS OF THE INDIANA ACADEMY OF SCIENCE, 1946, Vol. 56—P. D. Edwards, ed.—*The Academy*, 284 p., illus., \$3.00. Papers on subjects ranging from anthropology to zoology.

SCIENTISTS STARRED 1903-1943 IN "AMERICAN MEN OF SCIENCE", a Study of Collegiate and Doctoral Training, Birthplace, Distribution, Backgrounds, and Developmental Influences—Stephen Sargent Visser—*Johns Hopkins Press*, 556 p., \$4.50.

A SELECTED BIBLIOGRAPHY ON HIGHWAY SAFETY—*Highway Research Board*, Bibliography No. 2, 46 p., paper, 45 cents. While highway safety is the main point of emphasis here, design, construction and traffic facilitation are also included.

SEXUAL BEHAVIOR IN THE HUMAN MALE—Alfred C. Kinsey, Wardell B. Pomeroy, Clyde E. Martin—*Saunders*, 804 p., \$6.50. Based on interviews with more than 12,000 individuals in a study supported by National Research Council's Committee for Research on Problems of Sex, (See SNL, Nov. 29, p. 342.)

TALES FROM SPECKS OF DUST: Poems on the Atomic Age—Max Kaufman—*William-Frederick*, 52 p., \$2.00. Various topics portraying an intimate knowledge of the universe presented in verse.

UNDERSTANDING VECTORS AND PHASE—John F. Rider and Seymour D. Usan—*John F. Rider Pub. Inc.*, 153 p., illus., paper, 99 cents. Handy pocket-size book for those lacking technical training, clarifying many aspects in radio and electronics.

Science News Letter, January 17, 1948

GENERAL SCIENCE

Radio Storm Predictions Were 75% Correct in 1947

➤ ADVANCE warnings of bad radio reception or radio blackouts, issued by Science Service throughout the past year in exclusive forecasts, were correct three out of four times. Likewise good reception of shortwave radio broadcasts materialized as predicted 75% of the time.

These predictions, foretelling radio reception several days and often even a week in the future, compare favorably with the Bureau's daily warnings. On these, issued several hours in advance, their predictions were correct 92% of the time.

These up-to-the-minute forecasts can be secured twice an hour by tuning in on the Bureau's own station, WWV, at 2.5, 5, 10, 15 and 20 megacycles, audible almost anywhere in the world. If short-wave broadcasts are to come through clearly, "W"s (dot, dash, dash in Morse code) follow the time announcement.

Science News Letter, January 17, 1948

EMBRYOLOGY

Grow Chick Embryos Under Glass Dishes for Study

➤ CHICK embryos can be grown for study purposes with glass dishes substituted for their opaque eggshells, by a method which Dr. Nelson T. Spratt, Jr., of the Johns Hopkins University, has developed.

They do not develop to full hatching size, of course, but they can be carried along for several days, while students watch the beginnings of organ development. Effects of drugs and other chemicals can also be studied.

The embryos, at an early stage of incubation, are removed from the carefully shelled eggs and transferred to the covered glass dishes. They absorb a food mixture consisting of raw white of egg, agar (a seaweed gelatin), and a carefully adjusted solution of three mineral salts known as Ringer's solution.

Details of the technique are presented in *Science*, (Nov. 7, 1947).

Science News Letter, January 17, 1948

YOUR HAIR AND ITS CARE

By O.L. Levin, M.D. and H.T. Behrman, M.D.

Two medical specialists tell you what to do to save and beautify your hair, stimulate healthier hair growth, and deal with many problems, as: Dandruff—gray hair—thinning hair—care of the scalp—baldness—abnormal types of hair—excessive oiliness—brittle dryness—hair falling out—infection—parasites—hair hygiene, etc., etc. "A worthwhile book full of important information."

Ohio State Medical Journal

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New Machines and Gadgets

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 397. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

⚙️ **SHOULDER REST** fits all hand-set type telephones and gives freedom to both hands for making notes or other work while using the phone. It is made of cast aluminum, and has rubber grips to keep it in place over the shoulder while holding the phone to the ear.

Science News Letter, January 17, 1948

⚙️ **CASTER WHEELS** and wheels for floor trucks are modeled of resin and maserated duck canvas and consequently, will not mar fine floors. The material is strong and durable, easy-rolling, resilient, and resistant to oil, mild acids and temperatures from zero to 200 degrees Fahrenheit.

Science News Letter, January 17, 1948

⚙️ **ELECTRIC EYE**, used in combination with a special light beam, is sensitive to a distance up to 1,000 feet and is not adversely affected by outside light, rain or snow. The beam of light used is interrupted 900 times a second; the photo-electric relay is responsive only to this frequency.

Science News Letter, January 17, 1948

⚙️ **AUTOMATIC SWITCH**, to cut the ignition of an automobile if it overturns, consists of a small plastic bowl containing mercury in its bottom through which the electric current normally passes. When inverted, the mercury clears the electric terminals, thus breaking the current.

Science News Letter, January 17, 1948

⚙️ **FLOOR WAXER**, shown in the picture, has a four-foot handle about which is a transparent plastic cylinder that holds



a pint of liquid wax. A trigger on the upper end of the handle releases wax as needed to the polishing pad.

Science News Letter, January 17, 1948

⚙️ **BIRD FEEDER**, recently patented, is a covered glass box partly open on the front, with upright wood ends cut to fit securely on a window sill. Inside is at least one perch and one feeding trough.

Science News Letter, January 17, 1948

⚙️ **MULTIPLE-SHOT** blasting unit for coal mining, developed by the U. S. Bureau of Mines, is capable of firing 10 detonators connected in series with practically no danger of gas ignition. The four-volt cap-battery used by miners for illuminating purposes is a reliable source of energy for the unit.

Science News Letter, January 17, 1948

⚙️ **TWIN-CYLINDER ENGINES**, to power standard balloon-tire bicycles, are horizontally-opposed-design motors, each containing only five moving parts. Valves, tappets, connecting-rod bearings, and other sources of wear are eliminated.

Science News Letter, January 17, 1948

⚙️ **BOTTLE RESEALER** gives air-tight protection for carbonated beverages. The sealing device fits over the top of the partly emptied bottle; a quick turn of a hand screw on its top forces a rubber washer tight against its lip.

Science News Letter, January 17, 1948

You are invited to accept one of the few memberships still vacant in

Things of science

Membership is strictly limited to 10,000 and will be for at least the next nine months. This is America's most unique "club."

Each month you will receive a blue package of actual scientific specimens—experiment with them, handle them, smell them, even sometimes taste them. Clip this address label and mail with \$4 check today for year's membership.

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Question Box

AGRICULTURE

How could India's food production be increased? p. 45.

MEDICINE

How are babies endangered by pain-relieving drugs? p. 44.

What is the potential medical weapon against the atom bomb? p. 35.

Why is chronic illness a challenge to doctors? p. 36.

OPHTHALMOLOGY

What has a study on the effect of altitude on eyesight revealed? p. 37.

What is the new procedure for cataract surgery? p. 37.

PLANT PATHOLOGY

How can plants be tested for virus diseases? p. 39.

Photographs: Cover, U. S. Dept. of Agric.; p. 35, U. of Calif.; p. 37, Union Electric Co.; p. 39, Cornell U.

SCIENCE NEWS LETTER

Vol. 23, No. 4

THE WEEKLY SUMMARY OF CURRENT SCIENCE • JAN. 24, 1948

1 MAR 1948

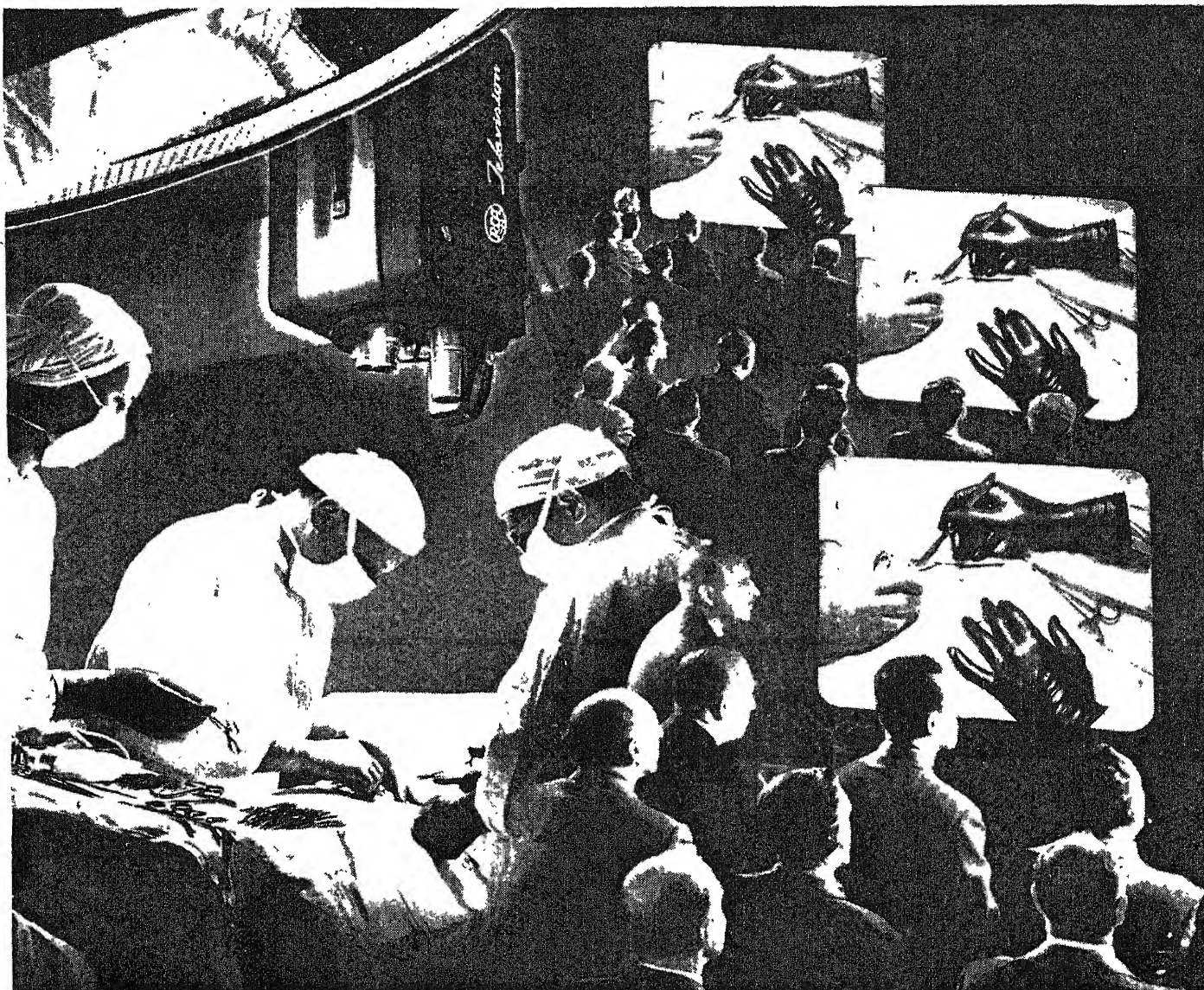
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Imperial Agricultural Research Institute
New Delhi.



Old At Sixty

See Page 58

A SCIENCE SERVICE PUBLICATION



Successful telecasts of surgical operations show value of television to medical education.

"Step up beside the surgeon—and watch"

Not long ago, a radio beam flashed across the New York sky—and "carried" more than 7000 surgeons into an operating room...

Impossible? It was done by television, when RCA demonstrated—to a congress of surgeons—how effective this medium can be in teaching surgery.

In a New York hospital, above an operating table, a supersensitive RCA Image Orthicon television camera televised a series of operations. Lighting was normal. Images were transmitted on a narrow,

line-of-sight beam... As the pictures were seen the operating surgeons were heard explaining their techniques...

The beam was picked up at a mid-town hotel—carried to RCA Victor television receivers. And on the video screens, visiting surgeons followed each delicate step of surgical procedure. Action was sharp and clear. Each surgeon was as "close-up" as if he were actually beside the operating table.

Said a prominent surgeon: "Television as a way of teaching surgery sur-

passes anything we have ever had... I never imagined it could be so effective until I actually saw it..."

Use of television in many fields—and surgical education is only one—grows naturally from advanced scientific thinking at RCA Laboratories. Progressive research is part of every instrument bearing the names RCA or RCA Victor.

When in Radio City, New York, be sure to see the radio and electronic wonders at RCA Exhibition Hall, 36 West 49th St. Free admission. *Radio Corporation of America, RCA Building, New York 20, N. Y.*



RADIO CORPORATION of AMERICA

MEDICINE

Story Starts Cancer Gift

Jackson Memorial Laboratory, where mice are bred for cancer research, received \$50,000 as a result of a Science Service story, to rebuild its fire-ravaged buildings.

► HOW a Science Service story in a Florida newspaper, the St. Petersburg Times, brought \$50,000 to aid an internationally famous cancer research laboratory was told by Dr. C. C. Little, director of the Roscoe B. Jackson Memorial Laboratory, and Mrs. Evelyn B. Monaco, of Gallup, N. Mex., at a meeting in Washington of the Ladies Auxiliary, Veterans of Foreign Wars.

The story was one in which a Science Service writer reported that medical authorities expected the search for a cancer cure to be slowed for years because forest fires had destroyed the Jackson Laboratory at Bar Harbor, Me., and its invaluable collection of mice specially bred for cancer research. (See SNL, Nov. 8, 1947).

When Mrs. Anna Mae Shaw of St. Petersburg, a past commander of the Ladies Auxiliary, V. F. W., read that Science Service story, she immediately clipped it from her newspaper and sent it to Mrs. Monaco. Mrs. Monaco is chairman of the organization's cancer research fellowship fund.

Mrs. Monaco and Dr. Little reported that the gift, which may reach \$500,000, will go to rebuild the summer students' laboratory, dining hall and three residence halls.

The money will be collected entirely within the membership of the Ladies Auxiliary, V. F. W. Each of the 500,000 members will be asked to contribute one dollar. The initial gift of \$50,000 will be made this year and the group expects to continue its aid for the next two at least.

The plan for the organization to aid cancer research was started by Mrs. Dorothy Mann of Kansas City, Mo., at its last annual encampment in late August, 1947.

Mrs. Monaco, the wife of a surgeon who is a member of his state committee of the American Cancer Society, was looking "for a place to center our interests," she said, when she received from Mrs. Shaw the Science Service story clipped from a newspaper. She wrote Dr. Little at once, received his thanks and acceptance within three days, and after further conference the plans were

worked out. This is the first time the Ladies Auxiliary, V. F. W., has undertaken a program of aid outside the organization.

Their minimum initial gift of \$50,000 will be enough to have the school built by next summer, Dr. Little said. Present plans, he pointed out, call for a laboratory where 40 students can work, a dining and recreation hall and residence halls built in a quadrangle to be known as the Ladies Auxiliary, V.F.W., Summer Research Laboratory. Simple, one-story wooden buildings that need no heating plant are planned. This type of construction makes possible maximum speed at minimum cost.

The summer laboratory has been training promising young men and women for the cancer fight for 18 summers. For the same length of time, Dr.

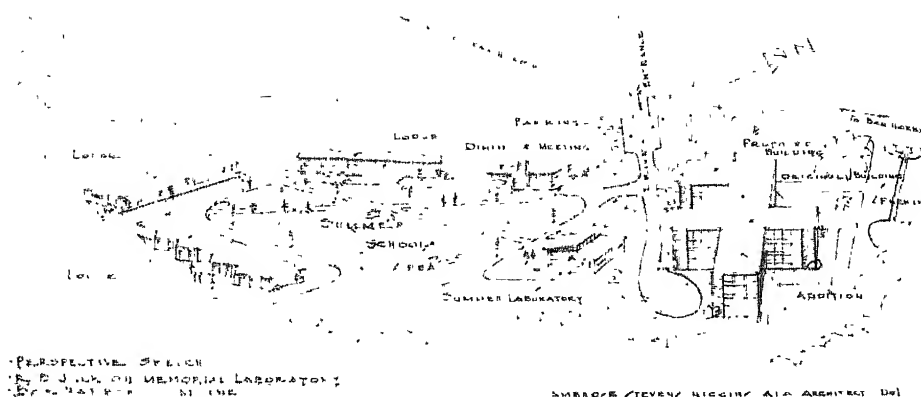
Little and associates have been digging for more knowledge about cancer and its growth with their specially bred strains of mice. In one strain cancer of the lung will develop in eight out of every 10 mice. In another strain, only one in a 1,000 get lung cancer. Altogether there were mice of 20 different strains at the laboratory before the disastrous fire last October.

From this laboratory hundreds of thousands of mice have gone to laboratories all over the world. Over 300,000 were sent out last year before the fire in October destroyed the laboratory and most of the mice. They were used for research on influenza, pneumonia, tuberculosis, rabies, yellow fever and infantile paralysis as well as for cancer fighting.

One wing of the main laboratory that was left standing and part of another have been restored enough for Dr. Little and associates to continue their work. Still needed, however, is \$200,000 to match the same amount offered by the National Cancer Institute for completely rebuilding the laboratory. Funds are also needed to replace the library and to build residence bungalows for visiting



MAKING RESEARCH PLANS—A project for building a great summer training center at the Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Me., is examined by (L to R) Mrs. Helen M. Murphy, Union, N. J., national senior vice-president, Ladies Auxiliary, V. F. W.; Mrs. Evelyn B. Monaco, Gallup, N. Mex., junior vice-president; Dr. C. C. Little, director of the Jackson Laboratory; and Miss Jane Stafford, Science Service Medical Writer. A story by Miss Stafford inspired the \$50,000 gift.



CANCER-FIGHTING CENTER—In the quadrangle at the left will be the laboratory for 40 students, dining and recreation hall, and residence lodges of the new summer school for student cancer fighters. At the right is the large building to house the laboratories, offices and famous mice of the Roscoe B. Jackson Memorial Laboratory. Not shown in the drawing but also planned if funds can be raised will be bungalows for visiting cancer researchers and their families.

scientists and their families and for an endowment for upkeep of the laboratory.

A summer center for cancer researchers from all over the world to work and

exchange ideas will develop if the hopes of Dr. Little, the American Cancer Society and the National Cancer Institute are fulfilled.

Science News Letter, January 24, 1948

MEDICINE

New Blood Center Starts

It will collect, process and distribute the blood free to those who need it. Rochester is first on this national life-saving program.

► MEN and women of Rochester, N. Y. and surrounding counties got the opportunity to be first to take part in a new life-saving, disease-fighting venture when Basil O'Connor, American Red Cross president, opened and dedicated the Rochester Regional Blood Center under the new national blood program.

Next time one of them reads in his newspaper that the life of someone in the region, an accident victim or a mother in childbirth, has been saved by a blood transfusion, he can say to himself, "I may have saved that life. It might have been my blood that was used."

The center will collect, process and distribute blood from and to the people of Rochester and the 11 counties in this region. Other centers, from here to California, will open rapidly one after another during the next few months.

The set-up is like that under which the Red Cross collected blood to save our wounded fighting men during the war. But it is a vastly expanded pro-

gram that is now getting under way. Civilians, as well as patients in Army, Navy and Veterans hospitals, will get the blood when they need it.

Bloodmobiles will go out into rural areas to collect blood and bring it to the regional center for processing. They will return it to hospitals and doctors serving rural areas for the benefit of people living there.

The blood will be free, a gift really from the hearts of Americans to their fellow-Americans in desperate need. The only charge will be whatever the hospital or doctor gets for the transfusion service.

Providing whole red blood for life-saving transfusions is the first aim of the program. But as the blood pours in and the banks grow full, some of it will be separated into fractions for fighting disease.

This is a measles year. Tens of thousands of children will catch this disease, but with the aid of one blood fraction, they can be protected against a severe

attack and its dangerous complications. Patients with hemophilia, others with a kind of kidney disease, still others having surgical operations can also be helped by different parts of the blood separated by methods devised by Dr. Edwin J. Cohn of Harvard.

Blood may have still undiscovered uses in fighting disease and death, Mr. O'Connor pointed out in his dedication of the center.

"All of us," he said, "I think have a strong feeling that this dedication is a milestone in the medical history of the country and in the improvement of healing and restorative facilities for our citizens. But none of us can foresee what tremendous scientific gains may result from the national blood program."

Science News Letter, January 24, 1948

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MEDICINE

Extract To Check Defects

Gamma globulin, substance from blood plasma, given to mothers who contract German measles, may protect the unborn from feeble-mindedness and blindness.

➤ **BABIES** may be saved from being born feeble-minded, deaf, blinded by cataracts or with damaged hearts by a substance in the blood, Dr. Charles A. Janeway of Harvard Medical School declared at the opening of the regional blood center in Rochester, N. Y., first unit in the American Red Cross National Blood Program.

The substance is called a gamma globulin. One gamma globulin separated from blood plasma is already being used to reduce the severity of an attack of regular measles in children.

The gamma globulin that might prevent congenital cataracts, deafness, heart disease and brain damage is for German measles. This usually mild and unimportant disease, it has recently been discovered, can damage the unborn child if it attacks the mother during the early months of pregnancy. Some medical authorities have even suggested abortions in such cases to prevent the birth of a defective child. Dr. Janeway hopes the gamma globulin he is investigating could be given to the mother to protect the unborn child.

Advances in the fight against tuberculosis, cancer, heart disease and allergic disorders such as hay fever are other possibilities Dr. Janeway foresees from further research on other substances derived from blood. He is now using a blood derivative, or fraction, from animal blood, to study experimental allergy in laboratory animals in order to learn more about the basic mechanism of these disorders. And another scientist is studying the tuberculosis germ by growing it in the clot made by the fibrinogen fraction of blood.

These fractions of blood are obtained as byproducts in the blood program. The primary object of the program is to make whole blood available without cost to victims of accidents, disease and injury anywhere in the nation. After three weeks, whole blood can no longer be used for transfusions. But its plasma can be removed and used or separated into the various fractions for study and treatment of disease.

Scientists feel sure that they have only begun to discover the disease-fighting

possibilities of these blood fractions. They have been handicapped, so far by lack of blood for such study. They and the sponsors of the National Blood Program look forward to the day when there will be enough blood centers throughout the nation so that more can be spared from the primary life-saving job for medical research.

Science News Letter, January 24, 1948

ENTOMOLOGY

DDT-Resistant Houseflies May Be Developing

➤ **HOUSEFLIES** which can survive the usual standard doses of DDT may be developing, the U. S. Department of Agriculture hinted in a report on DDT-resistant fly strains bred in the laboratory.

Only known flies which resist DDT and several other standard chemical killers are a strain developed at the Bureau of Entomology and Plant Quarantine laboratory in Orlando, Fla.

"It has been reported, however, that houseflies are becoming more difficult to kill with recommended applications of DDT in several parts of the United States and in some foreign countries," the Department of Agriculture acknowledged.

The hardy flies in the Florida laboratory are now in the 35th generation. As early as the third generation, it became necessary to use stronger doses of DDT to kill these flies. Ability to resist DDT is passed on to the flies' offspring, the experiments disclosed.

Bright side of the experiments is the conclusion that DDT has not lost its killing power. Entomologists believe that the ability to survive DDT of the new strain of flies may be more due to hardy, robust flies that might ordinarily require more than the usual dose of the insecticide. But if wild fly strains develop as much or even more DDT resistance as the laboratory insects have, future fly-fighting may be more complicated.

Not only DDT but also chlordane and chlorinated camphene, newly-developed chemical insecticides, and older standbys

including certain thiocyanate compounds, rotenone and pyrethrum, have failed to kill the hardy flies in the laboratory strain.

The 35 generations of flies in the laboratory would require four years in nature. Historic examples of insects developing resistance to standard chemical weapons used against them usually have required about two decades to appear.

Science News Letter, January 24, 1948

BOTANY

Moss That Shines in Dark Photographed in Own Light

➤ **COLOR** slides of one of the rarest plants in the world, a moss that seems to shine in the dark, were shown before the Sullivant Moss Society, an affiliated organization of the American Association for the Advancement of Science, by Prof. Charles J. Lyon of Dartmouth College. He found an abundance of the moss in a barn cellar at Groton, N. H., and was able to photograph it by its own light.

The moss is not really luminescent, but has an array of cells shaped like tiny automobile headlights. These catch and reflect the weak light entering its dim, damp abode, giving an effect that is startling to one not prepared for the sight.

Science News Letter, January 24, 1948



SHINING MOSS — The picture shows a luminous green layer of moss on the soil, believed to have been photographed for the first time in color by Dr. Charles J. Lyon, professor of botany at Dartmouth College, taken in the pocket between the lumber pile and the base of the stone foundation wall, all under a barn.

CHEMISTRY

New Candy Has Protein

Sweets incorporate as much as five per cent of the protein, derived from soybean, in hard taffy and as high as eight per cent in creams.

➤ CANDY that parents can urge their offspring to eat, instead of trying vainly to stop them, is the newest offering of chemists in the U. S. Department of Agriculture. The scientists have changed the sticky sweets into better-balanced foods by the addition of protein to their present all-carbohydrate makeup.

Dr. Louis B. Howard, chief of the Bureau of Agricultural and Industrial Chemistry, states in his annual report, just issued, that a clean-colored, tasteless soybean protein has been prepared and that it has been possible to work as much as five per cent of this into the familiar pulled hard taffy that children love. Soft candies, like nougats and cast creams, can now be made with protein contents as high as eight per cent.

Chocolate-coated marshmallows richly flavored and colored with raspberry puree are another yummy-sounding delicacy dreamed up by the Bureau's chemists.

However, the Department of Agriculture's laboratories are not being turned into one vast candy kitchen. Many products of great industrial promise, even if not so sweet, have been turned out during the past year.

One of these is a strong strawboard that may become useful in packing crates in place of the increasingly costly wood veneer now used. Eventually straw may also get into the building business, competing with the cane-bagasse and wood-fiber sheets now familiar. Since more than three-quarters of the 70,000,000 tons of straw annually produced in the United States goes to waste at present, there appears to be plenty of raw material available.

Dark, unappetizing color in both cottonseed oil and cottonseed meal can be practically eliminated, chemists at the Southern Regional Research Laboratory in New Orleans demonstrated. Two pigments found in cottonseed kernels were the cause of most of this color, and it was found possible to get rid of them by simply adding moisture when the stored seed was cooked in steam-jacketed pans.

One of the two pigments, known as gossypol, has been blamed for the slight

poisonous effect of cottonseed meal that has limited the use of this otherwise excellent source of protein in animal feeds. Hens fed on cottonseed meal produced by the new method laid a higher percentage of hatchable eggs than similar birds fed on the old-process meal.

Paint-brushes made from milk are now a possibility. At the Eastern Reg-

ional Research Laboratory at Philadelphia, casein fibers are being produced that compare favorably with natural bristles as paint-spreaders. One commercial firm has a pilot plant for their production in operation now, and as soon as manufacturing kinks can be ironed out will put the new-type brushes on the market.

Sumac leaves, at present valued only for their red beauty in autumn, bid fair to get a job at the tannery. Analyses show that they contain high percentages of tannin. The lining of pecan shells, that has such a puckering effect on your mouth if you chance to get a bit of it, is another possible source of tannin which is being investigated.

Science News Letter, January 24, 1948

DENTISTRY

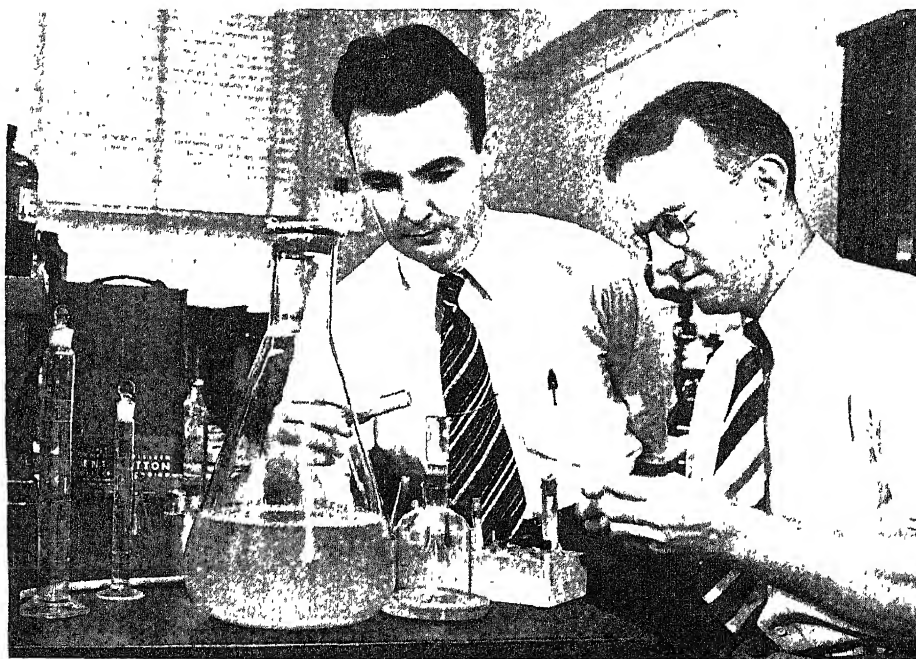
Decay Preventive Tested

➤ THE sweetest method yet proposed for preventing toothache and tooth decay is going on trial in a special colony of rats kept by Dr. James H. Shaw at Harvard School of Dental Medicine.

The method consists in adding a rare sugar, glyceric aldehyde, to ordinary sugar. For preventing tooth decay in humans, the plan calls for adding this

or some other effective chemical to sugar at the refineries. Then every piece of candy eaten, and every lump of sugar would carry its own decay preventive.

The plan was proposed by Dr. L. S. Fosdick of Northwestern University Dental School at a meeting of the American Public Health Association (*See SNL, Oct. 18, 1947*).



DISCOVERERS OF CHEMICAL CURE—Dr. T. D. Fontaine and Dr. G. W. Irving, Jr., are inspecting tomatin, the antibiotic made from juice pressed from leaves and stems of the tomato plant, which they developed at the U. S. Department of Agriculture's experiment station at Beltsville, Md. (*See SNL, March 22, 1947.*)

MEDICINE

Histadyl Is Ally of Drugs

This newest comer to the anti-allergy group prevents side reactions from such life-saving remedies as penicillin and streptomycin when given with them.

➤ PATIENTS no longer need to be excluded from the benefits of such life-saving remedies as penicillin and streptomycin because of allergic reactions. A new synthetic drug called Histadyl prevents their formation when given with other drugs in treatment, Dr. M. H. Mothersill of the medical department of the Lilly Research Laboratories, told the Indiana Section of the American Chemical Society meeting in Indianapolis.

The usefulness of many drugs has been limited because of the increasing number of side-reactions which accompanied their administration in patients. Dr. Mothersill treated such a group of 16 patients suffering from drug allergies with Histadyl given by mouth and found that it produced sufficient relief for the patients to tolerate the reaction-causing drug for "indefinite periods." Only one patient in this group failed to gain relief.

The dramatic action of Histadyl was demonstrated in a seven-year-old girl who had to have streptomycin, according to Dr. Mothersill. She was able to take one gram of the remedy daily for

three months with this new ally, but when the anti-allergy compound was withdrawn, the girl had skin eruptions which caused intense itching and burning.

Other conditions for which this latest member of the anti-histamine family of drugs is effective, are hay fever, food allergies, allergic headaches and even in some cases of reaction following blood transfusion.

Such side-reactions as drowsiness and lightheadedness were the only undesirable effects of the new drug. The physician declared that "rarely did these symptoms interfere with the patient's ability to continue the routine." Five patients examined expressly for the purpose of determining any accumulative bad effects from the drug, showed no evidence of damage to the blood, heart, liver or kidneys, although they had been taking the drug daily for three months.

But the physician believes that a study of a larger group of patients is necessary before it can definitely be assumed that no bad effects will follow.

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TOMATIN CRYSTALS — They have been found effective against athlete's foot fungi and other fungus growths and parasitic yeasts which cause disease in man and animals, including the fungi that produce skin and scalp ringworm.

Adding the chemical to sugar would stop tooth decay by checking the ferment which causes acid to be formed from sugar in the mouth, Dr. Fosdick explained. The acid, if not promptly neutralized, breaks down tooth enamel, removing the calcium, or lime, which makes it hard. Cavities form and the decay process sets in.

Announcement of the tests at the Harvard rat colony of Dr. Fosdick's method was made by Dr. Robert C. Hockett, scientific director of the Sugar Research Foundation.

Results of the tests should be known by May, he said. If the method works in rats, there is every reason to believe it will work in human mouths.

Glyceric aldehyde, the chemical to be added to sugar for preventing tooth decay, is such a rare substance that only two pounds of it are known to exist anywhere in the world. Almost all of this two pounds is in the possession of the Sugar Research Foundation. Dr. Fosdick obtained a small vial of it, made before the war in Europe, through the efforts of Dr. H. O. L. Fischer, son of the distinguished carbohydrate chemist, Emil Fischer. Dr. Fischer made the rest of it available to the Sugar Research Foundation as part of the program to discover uses for some of the 10,000 close chemical relatives and derivatives of common sugar.

Science News Letter, January 24, 1948

MEDICINE

Surgery Remedies Sterility

➤ MANY of the younger men in Europe who were sterilized by surgical operation under the Nazi regime can have another operation which will permit them to become fathers if they wish, Dr. Vincent J. O'Connor of Northwestern University Medical School declares.

The second operation may be successful in from 35% to 40% of the patients, he reports in the *Journal of the American Medical Association* (Jan. 17).

The figures are based on his own experience and that of 750 surgeons among 1,240 to whom he sent questionnaires on the subject. The possibility of success will depend, he states, on the freedom of the tissues from previous inflammation.

The normal male sex glands continue to produce spermatozoa, or male germ cells, for an indefinite period after the sterilizing operation. In one of Dr. O'Connor's patients an operation 18

years after the sterilizing operation was successful in restoring the patient's ability for parenthood.

The hopeless view taken by medical as well as lay and religious groups on the possibility of Hitler's victims being restored to normal after the sterilizing operation should be revised, Dr. O'Connor thinks, and surgical aid offered to those who request it. The reason for the hopeless view, it appears from his report, is that no one surgeon has had much experience with the corrective operation. This is because in the past most of the sterilizing operations have been done at the request of the patient and few of them have ever wanted to have their fertility restored.

Science News Letter, January 24, 1948

An even number of rows of grain are found on nearly all ears of corn.

MEDICINE

Count Heart Beats By Blowing Smoke

➤ YOU can count your heart beats by blowing smoke rings. This discovery may lead to a new approach to study of the arteries, a scientist of Edinburgh, Scotland, has suggested.

C. A. Beevers of the Dewar Crystallographic Laboratory explains his discovery in the new issue of the British scientific journal, *Nature* (Jan. 10).

"Choose a quiet room, fill the mouth with tobacco smoke and blow gently out through a very small aperture between pursed lips," he directs.

The fine jet of smoke will pulse from between your lips at intervals corresponding to your heart beat.

"With a delicately controlled jet it is even possible to make the heart blow a smoke ring at each beat."

The Scottish scientist explains that the heart is giving a pulse of pressure to air in your mouth.

"The pressure pulse may be communicated directly through the heart wall, or perhaps it is given by way of the arteries to the throat and mouth."

Use of a quick-acting pressure-measuring device may make it possible to gain useful information about the conditions of the arteries responsible, he proposes.

Science News Letter, January 24, 1948

AERONAUTICS

Squatting Cargo Plane Makes Loading Easier

➤ A CARGO plane that squats down close to the ground for loading and unloading, instead of requiring the use of a heavy ramp or a mobile freight elevator, is a newly patented invention. The design is by Camille R. Lemonier of East Aurora, N. Y., and Samuel T. Payne of Kenmore, N. Y., who have assigned rights in their patent, No. 2,434,464, to the Curtiss-Wright Corporation.

On alighting at a landing field, the plane taxis up to a stack of waiting cargo. There the landing-gear is half-retracted, letting the fuselage down until its belly touches the ground. Then two segments of its nose fold upward on hinges, leaving a wide front entrance. At the same time a smaller part of the forward fuselage wall hinges downward until its free edge touches the ground, serving as a short, built-in ramp.

After the loading crew have stowed

and secured the cargo and the big front opening is closed, the hydraulically operated landing gear heaves the fuselage up to normal starting height and the plane is ready to take off. Once aloft, the landing gear is fully retracted, stowing the wheels into recesses that lie partly in the upper part of the fuselage and partly in the roots of the high wings.

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MEDICINE

Devil's Grip Catching, Doctors Find in Epidemic

➤ A STRANGE disease called devil's grip has been epidemic in Boston and Baltimore last summer and fall, Drs. H. M. Harvey, Philip A. Tumulty, Frederick R. Bang and Charles I. Leftwich of Johns Hopkins School of Medicine reported at the meeting of the Southern Medical Association in Baltimore.

Medical name for the disease is pleurodynia, meaning pain in the chest. In Dr. Harvey's opinion, this pain-in-the-chest disease is another form of a pain-in-the-neck condition which doctors call cervical myalgia. Both, he believes, are caused by a virus. They are catching diseases, probably spreading by direct contact. In the Baltimore epidemic the first patient seen was the wife of one of the resident doctors at the Johns Hopkins Hospital. The next two patients were friends of hers, one a nurse who took care of her.

The disease starts suddenly, without previous warning signs, with a severe pain in the lower chest. This pain is made worse by deep breathing, coughing and sneezing. The temperature suddenly rises to 102 or 103 degrees Fahrenheit and returns to normal within 12 to 48 hours.

After two or three days, there may be a second rise in temperature. The patient may also have a severe headache in the forehead region.

The patient usually is well in two to seven days, though occasionally the disease lasts as long as two or three weeks.

No deaths have ever been reported from this condition. The first reported epidemic was in Charlottesville, Va., in 1888. Almost all outbreaks have been in late summer and early fall and in the U. S. have been in eastern seaboard cities. Outbreaks in Sweden have usually been along the coastal area.

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ENGINEERING

Dual Fuel System for Use In Automobiles Suggested

➤ Dual fuel systems for automobiles and other motor vehicles were recommended at the Detroit meeting of the Society of Automotive Engineers by W. M. Holaday, Socony-Vacuum Laboratories, New York City. Two different grades of gasoline would be used.

One of the fuels in this dual system would be gasoline high in performance value and would be used for short periods. The other would be a lower-quality fuel for normal cruising operations.

Current spot shortages in motor fuel arise chiefly from lack of transportation and refining facilities in certain areas, he declared. Higher prices for petroleum fuels and lubricants must be expected because of the higher cost of production. Discovery costs of crude oil were estimated by him to have risen to an average of 54 cents a barrel in 1946, compared with 16 cents in 1936. The average investment in a new well approximates \$600,000, partly due to the necessity of drilling to lower depths.

Science News Letter, January 24, 1948

ENGINEERING

Porcelain May Replace Metal Blades in Turbines

➤ THE use of refractory porcelains as material for blades of the turbines of turbo-jet powerplants is a promising possibility, the Detroit meeting of the Society of Automotive Engineers was told by R. F. Geller of the National Bureau of Standards, Washington. Porcelains have been found which can replace metallic alloys at temperatures above 1,500 degrees Fahrenheit.

He pointed out that, at high temperatures, a porcelain blade with a tensile strength of 17,000 pounds per square inch would be the equivalent of a metal having a strength of 47,000 pounds per square inch. The new porcelains, he said, suggest ways and means of increasing the net efficiency of turbine powerplants by permitting operation at temperatures of 1,800 degrees Fahrenheit, and higher.

Science News Letter, January 24, 1948

THE FIELDS

VETERINARY MEDICINE

Nitrogen War Gases Used As Medicine for Chickens

➤ NITROGEN mustard war gases may turn out to be good medicine for chickens sick with the highly fatal fowl disease, leucosis, it appears from studies by E. P. Johnson at the Virginia Agricultural Experiment Station at Blacksburg, (*Science*, Jan. 9).

Fowl-leucosis is something like the group of human diseases which include leukemia, Hodgkin's disease and lymphosarcoma. Nitrogen mustards have been tried in these human diseases with results which Mr. Johnson thought "sufficiently encouraging" to warrant their trial on the fowl disease.

He injected the war gas chemicals into 33 birds artificially infected with the fowl leucosis virus. After one treatment, nine birds recovered completely. In another group of seven birds that got the disease through naturally acquired infection, the treatment helped one make a complete recovery that lasted eight months. The others were not helped.

The results, which Mr. Johnson terms "not highly impressive," show that if the compounds are given early in the disease they have a better effect and one which is more likely to be permanent. In advanced cases the effects were only temporary.

Besides apparently acting to check the too great multiplication of certain blood cells, the nitrogen mustards seem to kill the virus that causes the fowl disease.

Science News Letter, January 24, 1948

POPULATION

Population Increase in 1947 Sets New Record

➤ A NEW record for population increase was set in 1947. Thanks to an extraordinarily large number of births and to a low death rate, the excess of births over deaths exceeded 2,400,000 last year.

There may well be 150,000,000 people living in the United States by the end of 1950, statisticians of the Metropolitan Life Insurance Company estimate.

The natural increase in our population during 1947 is more than double that for

each year from 1930 through 1940, and is nearly three times that for 1936, figures compiled by the Social Security Administration show.

The excess of births over deaths during the year just ended was almost as large as the average number of babies born each year in the decade between 1930 and 1940.

About 3,900,000 babies were born in the United States in 1947. This was the first time in our history that the stork made more than 3,500,000 trips to homes in this country. It was the fourth time—each time being within the present decade—that more than 3,000,000 babies were born during any one year.

About 27 babies were born for every 1,000 people in the United States during the past year. This is the highest birth rate in at least 25 years, and is 50% above the figures for 1933, when the birth rate dropped to its lowest level.

In recent years there has been a remarkable improvement in infant mortality. The rate has been reduced by one-third since 1939 and by one-half since 1930. Although about as many infants died last year as in 1933, the number born was 70% higher. About 100,000 babies were saved by the reduction in infant mortality.

It is likely that the death rate in 1947 will prove to be the lowest ever recorded, the statisticians point out. This would result from making adjustments to take care of the increase in the number of babies and of older people. The general death rate in 1947 was slightly higher than in 1946, provisional figures indicate.

Science News Letter, January 24, 1948

ASTRONOMY

Astronomical Observatory To Be Built in Michigan

➤ NEW secrets of the sun and stars may be discovered through erection of an astronomical observatory at the University of Michigan. To be equipped with a 24-inch Schmidt-type reflecting telescope, this observatory is expected to be completed within the year.

One of the world's centers for solar research is the McMath-Hulbert Observatory, operated by the University near Pontiac. During the war, investigators at this observatory developed the bomb-sight used by the Navy. Today reports of solar activity secured here are vital in making up-to-date predictions as to whether shortwave radio broadcasts will come through clearly or be blacked out.

Science News Letter, January 24, 1948

AERONAUTICS

Safer Forced Sea Landings Provided by Hydro-Flaps

➤ SAFER forced sea landings by some of the new Navy land-based patrol planes will result from hydro-flaps installed on the belly of the fuselage. These downward, backward fin-like surfaces, closed into the plane ordinarily, will act like skis to keep the nose of the landing plane out of the water.

They are of assistance only in making the landing and during the ditching run. Their advantage is their ability to delay the immediate sinking that is apt to follow a nose dive. Also they will lessen the excessive strain when the aircraft hits the water that sometimes causes it to break in half.

These hydro-flaps are much like the so-called hydro-foils used on speed boats to lift their hulls completely out of water when traveling at high speeds.

Science News Letter, January 24, 1948

PHOTOGRAPHY

Improve Colored Prints With Chemicals in Films

➤ PHOTOGRAPHERS will get better colored prints by the use of chemicals called colored couplers in a film which give automatic color correction, it is revealed by Eastman Kodak Company. A coupler is a chemical which combines with others to produce a dye.

In a new color film, special types of couplers will be included in each of the thin light-sensitive layers. These are the blue, green and red sensitive layers. A yellow filter layer, also in the film, protects the green and red sensitive layers from blue light.

The problem of compensation for the unwanted absorption of light is now solved chemically. The new method is based on the discovery that azo dyes giving the proper absorption can be attached to couplers, and that during the coupling reaction the azo group is eliminated.

The result of the coupling reaction is, therefore, to destroy the inherent color of the coupler in the process. After color development there are present in the emulsion layer a negative image of the coupler dye and a positive image of the remaining unreacted coupler.

The new film containing the color couplers is not yet on the market. When it is, it will be known as Ektacolor.

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ZOOLOGY

Man Outlives Animals

Despite legends to the contrary, only giant tortoises live longer than man. Elephants have a life expectancy of 45 and the oldest parrot on record died at 54.

By DR. FRANK THONE

See Front Cover

➤ EXCEPT for a few species of giant tortoise—and who wants to be a tortoise?—man lives the longest life of any animal on the face of the earth.

Threescore years and ten was the lifetime assigned to man by the Psalmist, and that is still counted a fair old age after 30 centuries. And just as David and other Old Testament writers lamented the brevity of human life, people today feel that 70 years is not enough, and envy animals reputed to reach extreme ages of 300 or 400 years.

If there is any consolation in living longer than other creatures, we have it. Our seven decades, short though they seem, really represent a longer life-span than that of all except some species of giant tortoise.

Among his nearest animal kin, the warm-blooded mammals, man is easily the patriarch.

Old legends die hard, and the idea that man is the longest-lived of warm-blooded creatures will be disputed by many. Nevertheless, this view is supported by a careful examination of all really verifiable records, made by many zoologists and collated by R. Marlin Perkins, director of the Lincoln Park Zoo in Chicago. A considerable share of his figures come from Maj. Stanley Smyth Flower of the Zoological Society of London, the rest from American zoological parks.

Represent Extreme Ages

All figures represent extreme ages reached by animals in captivity. There are no reliable figures for the life-spans of wild animals, but it is probable that most of them are shorter than the limits attainable in captivity. The relentless law of the jungle, that killers eat the old and the weak first, would seem to take care of that.

Three animals that are often reputed to outlive man by many years, even to fantastic limits, are elephants, parrots and the giant tortoises of the Galapagos islands. Actually, the greatest surely

known age for an elephant is 60 years, with an average life expectancy of 45. The oldest parrot on record died at 54; other parrots have lived to be nearly 50. Cockatoos, closely related to parrots, reach ages between 30 and 40 years.

Only the tortoises outlive man, though the claims of 300 years and more cannot be authenticated. The Galapagos tortoise is known to live more than 100 years; another species, Marion's tortoise, holds the record at 152 years. Size does not have any necessary correlation with age: the little Carolina box turtle has been known to live as much as 123 years, whereas the big, mean-tempered alligator snapping-turtle can claim only 42. Also, the loggerhead, a sea turtle that rivals or surpasses the Galapagos tortoises for size, doesn't quite make the 40-year mark.

Reptiles Don't Live Long

Other reptiles do not live as long as the oldest tortoises. There is an acceptable record of more than 56 years for an American alligator, 50 years for its Chinese cousin. Snakes are even shorter-lived: the anaconda age record is 29 years, but two other huge constrictor snakes, Indian python and Madagascar boa, have only 20 years to their credit. The cotton-mouth moccasin, menace of our own Southern swamps, beats that score a little with 21 years. Most lizards die before they are 20, but one strange and little-known species, the legless European slow-worm, has been known to survive as long as 32 years.

Next to man's 70 to 100 or more years, and the elephant's 45 to 60, greatest longevity among mammals is claimed for the rhinoceros, with 36 to 50 years. Horses are fairly long-lived, reaching 15 quite often, with an extreme of 35. The lion, long hailed as King of Beasts, has a short reign of only eight to 15 years—less than many an old dog and no more than some tough tomcats. The industrious beaver outlives the sly fox, with an extreme age limit of 15 years against 12. And only the immortal reindeer of Santa Claus live more than 15 years.

Why have elephants and parrots been picked out for longevity honors that prove to be fictitious? And why are tortoises credited with being three or four times as old as they actually are?

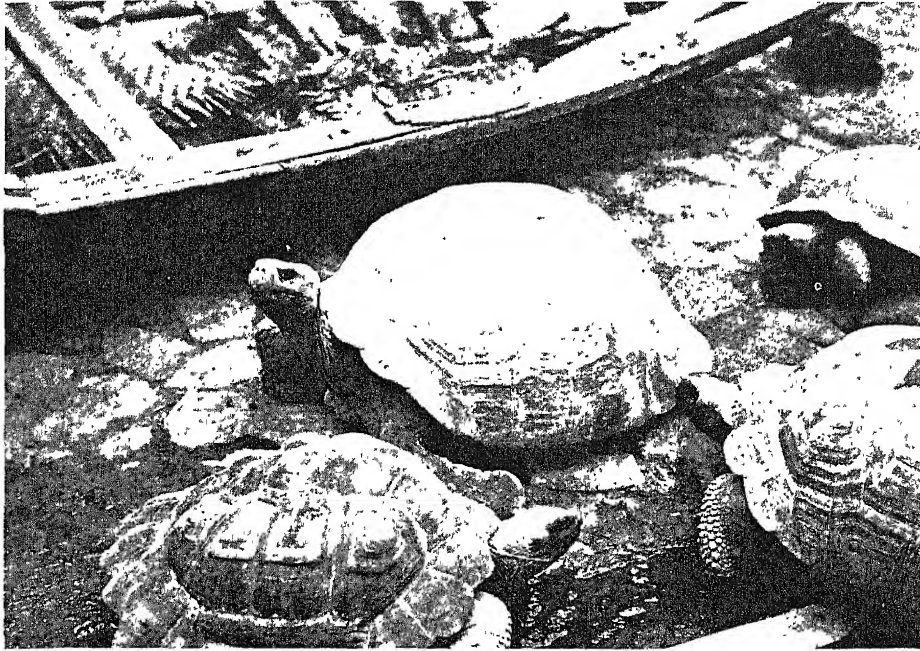
The answer may be in a curious quirk of "anthropomorphizing"—the tendency to read human meanings into non-human lives because of chance resemblances. Parrots have wrinkles in the bare skin around their eyes; tortoises have wrinkles on their legs and necks; elephants are wrinkled all over. All three animals are slow-moving. Old men are wrinkled and move slowly. That is enough to create a myth in sufficiently uncritical minds.

Antiquity of Pets

There are a few histories of apparent vast age in certain animals—usually mascots or pets. It is relatively easy for such records to be manufactured, and with no intentional deception, either. An animal will be adopted into a family or a regiment, live to a respectable age, and die. Another of the same species will be taken up as a replacement, given the same name, and because there is no carefully kept written record will eventually be remembered by a great-grand-



NOT AS OLD AS YOU THINK—
Legend has it that parrots are able to outlive man by many years. Actually, the oldest parrot on record died at 54 while others have been known to live to be nearly 50.



OUTLIVE MAN—Tortoises consistently top the century mark but no one has been able to prove the fantastic claim that they live to be 300 and more years old.

sire or an old retired sergeant as the same animal.

That sort of thing is known to have happened among human beings, where, for example, a John Smith is in a parish record as having been born in 1800, and a very old John Smith is equally well recorded as having died in the same place in 1940. But that does not prove that John Smith was 140 years old when he died. The John Smith who died in 1940 was perhaps the son or even the grandnephew of the John Smith who was born in 1800. If one death went unrecorded and one birth was similarly neglected, such a confusion could easily arise.

One quite understandable human trait helps to account for the easy acceptance of such fantastic claims, whether for old men or old animals. We all like to claim association with the biggest, the strongest, the oldest, even the loudest and funniest; there is some kind of nourishment for our self-esteem in this reflected glory, no matter how thin. So there is a temptation, usually unresisted because unrealized, to take your neighbor's word for it if he says his parrot was handed down in the family from his seafaring great-grandfather and is undoubtedly 200 years old.

There is a definite cash value, of course, in the claims to antiquity advanced by circuses on behalf of their

animals, especially elephants. Every circus elephant becomes a centenarian as soon as she has her full growth, and remains that way until she dies of old age at 60. This reversal of the glamorization process employed on female entertainers of our own species is one of the conventions of circus life; it is frankly fictional and nobody is expected to believe it. Ironically, too, although the people of the big top always refer to elephants as "bulls," all circus elephants are females—for the quite practical reason that they are much more docile and manageable. They don't even object to having their ages falsified upwards.

Science News Letter, January 24, 1948

ZOOLOGY

Protozoa Researchers Form New Scientific Society

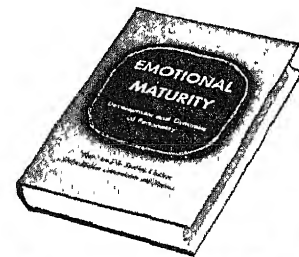
➤ RESEARCHERS on the smallest and simplest of animals, the myriad microscopic life-forms known as protozoa, have founded a new scientific organization, the American Society of Protozoologists.

First president of the new group is Dr. Ross F. Nigrelli of the New York Aquarium. Prof. Theodore L. Jahn of the State University of Iowa is secretary-treasurer.

Science News Letter, January 24, 1948



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Do You Know?

It takes five tons of *coal* to make one ton of steel.

Tantalum is a heavy metal, with a density about twice that of steel.

During 1947, American rubber companies used over 1,100,000 tons of synthetic and natural *rubber*.

A total of 961 *aircraft* are now in commercial service in America; of these, 168 are on routes to foreign countries.

Investigations of ancient civilizations show that vegetable *tanning processes* for making leather have been known since the dawn of history.

Magnesium is the lightest of the present commercial *metals*; aluminum is 50% heavier, steel weighs four times as much, and copper five times as much.

The so-called twinkle of *stars* is due mainly to regions of different density in the earth's atmosphere which are moved around with normal air movements.

"*Wet water*" is a term used by chemists for water containing organic chemicals known as wetting agents that cause a fast penetrating action by the mixture.

Moored balloons six feet or more in diameter must be operated under government permit if used in zones or at altitudes where they are a hazard to aircraft.

MEDICINE

Cold Germ Is Isolated

V14A, as it is called, has been grown on fertile hen's eggs for almost a year. Fifty-seven of 60 healthy men sprayed in the nose with it got mean colds.

➤ MEET V14A. It has just made its formal bow to the world of science, though you and many a scientist are doubtless already well acquainted with it. V14A will give you a mean cold when you do meet it, or when your nose meets it. It is a common cold-causing germ. Scientists at the National Institute of Health in Washington washed it, with milk, from the nose of a man coming down with a cold. For almost a year they have kept it growing in fertile hen's eggs. And when they sprayed it into the noses of human volunteers, 57 of 60 healthy men got the same kind of mean cold.

This germ going under the name of V14A in the laboratory, may not be the only germ that causes colds. But there is no doubt that it is one of them, and now that the scientists have got it in their eggs and can keep it there, they can go on to the hard job of trying to find a way of curing or preventing the cold it causes.

The letters and numbers of the name, V14A, identify the germ as having come from the fourteenth volunteer in the first nasal washing. Details about the isolation and study of it so far are reported by Drs. Norman H. Topping and Leon T. Atlas in the journal, *Science* (Dec. 26).

Dr. Atlas himself has a V14A cold all the time. That is because he goes every day to nearby Lorton Reformatory to spray the germ into the noses of the Lorton volunteers.

Lorton is the District of Columbia institution corresponding to penitentiaries in the states. Of its 2,000 inmates, 500 have volunteered to help in the fight on the common cold and 200 have so far been used. They get paid \$3 a week instead of the \$1 they would get from prison industry work. And they may draw all of this weekly for purchases at the canteen instead of having to put half of it in their parole fund.

Dr. Atlas located V14A when he was giving a physical examination to another scientist who had applied for a U. S. Public Health Service fellowship. Noticing as he looked down the man's throat and up his nose that there was a faint

reddening suggestive of an oncoming cold, he asked permission to get a nose washing. The man agreed. The first washing, done at three o'clock that afternoon, proved unsuccessful. So Dr. Atlas routed the man out of bed at midnight to get another. By that time his man had a faint "peppery feeling" in his nose, an itching in his palate and was beginning to sneeze. Next day he had a mean cold.

Drs. Topping and Atlas are sure their V14A is not a bacterium, because they treated the nasal washing with penicillin and streptomycin to get rid of any bacteria that might have been washed out with the cold germ. Later tests failed to show any bacteria in the cold-causing material. Other tests showed it is not the influenza virus.

The electron microscope has been turned on it by Dr. R. W. G. Wyckoff. His studies are just starting, but he has already seen some characteristic particles that have not so far been seen in material from normal allantoic fluids from eggs nor in such fluids of eggs inoculated with normal fluids. These particles, which are probably V14A itself, are of the same general size as influenza virus particles but readily distinguishable from them.

Science News Letter, January 24, 1948

CHEMISTRY

Quicker, Better Test for Meat Toughness Revealed

➤ MEAT may become scarcer but it need not become tougher. To guard the consumer through establishment of easier and more objective testing for quality, Drs. Herbert Baker and George D. Palmer of the University of Alabama have devised a new chemical method.

First, the meat to be tested is immersed in a solution of nitric acid, which dissolves out the connective tissue that is the principal factor in toughness. Then a phospho-tungsten compound is added, producing a precipitate. This can be dissolved in boiling water; the tougher the meat, the longer it takes to dissolve the precipitate.

Science News Letter, January 24, 1948

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What Are Evergreens?

► "EVERGREEN" is very commonly used as equivalent to "conifer"; people say "evergreen" when they mean trees of the group that includes pines, spruces, firs, red cedars, etc. But not all evergreens are conifers, and there are some conifers that are not evergreens.

Properly speaking, an evergreen is any tree or lesser plant whose foliage stays green all winter, regardless of size or family connections. Plants of opposite habit, that lose their leaves in autumn and grow new ones in spring, are termed "deciduous." The conifers listed in the first paragraph, and many more besides, are true evergreens; but at least two American conifers, the bald cypress and the larch or tamarack, lose their leaves each year and are thus deciduous.

Broad-leaved trees like maples, elms and oaks are so universally deciduous in northern latitudes that they are usually thought of as typical deciduous trees.

Yet farther south there are numerous broad-leaved trees and shrubs that are just as typically evergreen: such things as bay, mountain laurel, rhododendron, liveoak and some species of magnolia.

That botanical kinship has nothing to do with evergreenness or its opposite is well typified in the heath family, of which mountain laurel and rhododendrons are examples. Azaleas, which are very closely related to the rhododendrons, are deciduous, as is the sourwood, the one tree-sized member of this family in our southeastern states. Among this family's shrubs of lower stature, cranberries and bearberries are evergreen, whereas huckleberries and blueberries are deciduous.

We are apt to think of herbs, the plants that have no woody stems, as deciduous, dying down to ground level every winter even when they live to bloom another day by means of root-stocks or bulbs underground. Yet there are many evergreens among these plants: mosses and some ferns, ground-pines, hepaticas, trailing arbutus, day-flower and (of course) wintergreen.

Evergreen leaves naturally do not live forever. Some, like the overwintering leaves of hepatica, wither and die soon after the new leaves unfold in spring; others like most pines, hang onto their leaves as much as five years. There is no set rule; each species makes its own rules.

Science News Letter, January 24, 1948

MEDICINE

Tropical Diseases Recur

Servicemen and travellers may have a flare-up of maladies strange to the U. S. years after their return from abroad. Many have vague symptoms.

► TROPICAL diseases strange to the United States may flare up in servicemen and in postwar travellers years after their return from overseas, doctors are warned in the *Journal of the American Medical Association* (Jan. 10).

Many of these diseases may get into the chronic form with vague symptoms that are like those found in psychoneurotic patients. A tired feeling, frequent headaches, loss in weight, nervousness, palpitation, uneasiness and mild to moderate stomach and intestinal distress are symptoms of chronic forms of amebiasis, schistosomiasis, malaria and Chagas' disease as well as of psychoneurosis.

A case of kala-azar developing in a pilot officer 17 months after his return to the United States and 19 months after he had left China where he probably got the disease is reported from the AAF Regional Station Hospital at San Antonio by Capt. Moise D. Levy, Jr., of the Medical Corps and Lt. Marvin J. Yiengst of the Sanitary Corps.

The young pilot's symptoms were vague and at first it was thought he had malaria and he was treated for that. But no malaria parasite could be found so that treatment was stopped and he was put on penicillin. After about two weeks during which time many tests were made, a button of bone was cut from

his chest bone with the kind of crown saw surgeons call a trephine.

Kala-azar germs were found in the marrow of this bit of chest bone. The patient was promptly given doses of an antimony compound, standard treatment for kala-azar.

"Response to treatment was dramatic," the Army surgeons reported. "The temperature returned to normal after three days. Appetite greatly improved. Four meals daily were enjoyed. There was a progressive gain in weight from 130 pounds to 152 pounds."

Two months later the patient was returned to duty with no sign of the disease.

Science News Letter, January 24, 1948

YOUR HAIR AND ITS CARE

By O.L. Levin, M.D. and H.T. Bohman, M.D.

Two medical specialists tell you what to do to save and beautify your hair, stimulate healthier hair growth, and deal with many problems, as: Dandruff—gray hair—thinning hair—care of the scalp—baldness—abnormal types of hair—excessive oiliness—brittle dryness—hair falling out—infection—parasites—hair hygiene, etc., etc. "A worthwhile book full of important information."

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Books of the Week

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ANIMAL BABIES—Kathryn and Byron Jackson, pictures by Adele Werber—*Simon & Schuster*, 39 p., illus., 25 cents. Pictures and stories about many wild baby animals, for the very young.

THE BATTLE FOR TARAWA—James R. Stockman—*Govt. Printing*, 86 p., illus., \$1.50. One of a series of monographs prepared by Historical Section, Div. of Public Information, U. S. Marine Corps, presenting details on the first example of a sea-borne assault against a heavily defended coral atoll.

A BIBLIOGRAPHY OF DIETETIC CAREERS—*Am. Dietetic Assn.*, 15 p., paper, 10 cents.

THE CHEMICAL ANALYSIS OF FOODS—Henry Edward Cox—*Sherwood Press*, 3rd ed., 317 p., illus., \$8.00. A handbook for the food industry in general and health officers and food chemists in particular, covering the examination of foodstuffs and detection of adulterants.

COMPOSITION AND PICTURES—Eleanor Parke Custis—*Am. Photographic Pub.*, 224 p., illus., \$6.00. A practical, detailed explanation of the basic rules of composition as applied to camera work.

THE ELECTRON MICROSCOPE—V. E. Coss-

lett—*Sigma*, 128 p., illus., \$1.55. A non-technical description of construction and operation of the electron microscope together with its pretest limitations and future developments.

EXPERIMENTAL EMBRYOLOGY IN THE NETHERLANDS 1940-1945—M. W. Woerdeman and Chr. P. Raven—*Elsevier*, 132 p., illus., \$2.50. Experiments on amphibian eggs and avian embryos described in Monographs on the Progress of Research in Holland During the War, No. 10.

FLYING MINUTE MEN: The Story of the Civil Air Patrol—Robert E. Neprud, with cartoons by Zack Mosley—*Duell, Sloan and Pearce*, 243 p., illus., \$3.00. The saga of a volunteer organization pledged to the nation's defense—its role in World War II and place in the postwar aviation picture.

FUNDAMENTALS IN CHEMICAL PROCESS CALCULATIONS—Otto L. Kowalke—*Macmillan*, 158 p., \$2.80. Textbook for chemical engineering students in their second year.

GOLDEN MULTITUDES: The Story of Best Sellers in the United States—Frank Luther Mott—*Macmillan*, 357 p., \$5.00. An entertaining account of American best sellers from 1662 to 1945 with discussion of what makes them so.

HOW TO DOUBLE YOUR VOCABULARY—S. Stephenson Smith—*Crowell*, 360 p., paper \$1.50, cloth \$3.00. By means of vocabulary tests throughout the book, the author attempts to help you ascertain your command of words, including the latest language used in the newspapers, radio and science.

INTRODUCTION TO MEDICAL SCIENCE—Gulli Lindh Muller and Dorothy E. Dawes—*Saunders*, 2nd ed., 580 p., illus., \$3.00. A textbook for the student nurse with emphasis on fundamental principles of medical science, revised to include recent outstanding findings in research during World War II.

A LIST AND INDEX OF THE PUBLICATIONS OF THE UNITED STATES NATIONAL MUSEUM (1875-1946)—Smithsonian Inst. Editorial Div—*Govt. Printing*, U. S. Nat. Museum Bulletin 193, 306 p., paper, \$1.00. Published as part of official observance of 100th anniversary of founding of Smithsonian Institution.

THE MENTAL HOSPITAL: A Guide for the Citizen—Edith M. Stern, with foreword by Samuel W. Hamilton—*Nat. Com. for Mental Hygiene*, 45 p., paper, 38 cents. A handbook intended to help the layman properly evaluate conditions in mental institutions.

MODERN PACKAGING ENCYCLOPEDIA 1948—Staff of Modern Packaging Magazine—*Packaging Catalog Corp.*, 1205 p., illus., \$6.50. Covers the broad field of packaging including basic economic factors and principles together with a useful buyers' guide.

MOLECULES AGAINST MICROBES—E. S. Duthie—*Sigma*, 156 p., illus., \$1.25. The science of chemotherapy, chemical attack on infections caused by protozoa and bacteria, is presented in popular language.

NEUTRON EFFECTS ON ANIMALS—Biochemical Research Foundation—*Williams & Wilkins*, 198 p., illus., \$3.00. Reports on physiological effects of neutron bombardments to tissues and organs under different conditions, including effects on mortality, plasma, body weight, bone marrow, etc.

NEW COLLEGE STANDARD DICTIONARY—Charles Earle Funk, ed.—*Funk & Wagnall*, 1404 p., illus., \$6.00. Printed in clear, easy-to-read type with simplified system of phonetic pronunciation, this emphasis edition of a standard reference book lists more than 145,000 words including many recent terms used in modern science.

ORTHOPEDIC SURGERY FOR NURSES INCLUDING NURSING CARE—Philip Lewin—*Saunders*, 4th ed., 563 p., illus., \$3.75. This textbook for students and graduate nurses presents the latest facts on orthopedic care, stressing actual nursing care and including many advances proven practical in treating war casualties.

PHOTOGRAPHIC FACTS AND FORMULAS—E. J. Wall and Franklin I. Jordan—*Am. Photographic Pub.*, rev. ed., 364 p., \$5.00. Handbook of practical directions and formulas for commonly used photographic processes.

POSTWAR PROBLEMS OF MIGRATION—*Milbank Memorial Fund*, 173 p., illus., paper, \$1.00. Papers presented at the round table on population problems at the Fund's 1946 conference, covering world aspects of migration, immigration to U. S., and U. S. internal migration.

WIND WAVES AT SEA, BREAKERS AND SURF—Henry B. Bigelow and W. T. Edmondson—*Govt. Printing*, Hydrographic Office Publication No. 602, 177 p., illus., \$2.80. Based on research and observations over a long period of time, this detailed and non-technical discussion of oceanography will prove useful to mariners and non-seafarers alike.

THE WORLD'S GREAT LAKES—Ferdinand C. Lane—*Doubleday*, 254 p., \$3.50. An interesting story written in easy manner giving a world of information about lakes, ranging from their natural formation and discovery to man-made creations and problems.

Science News Letter, January 24, 1948

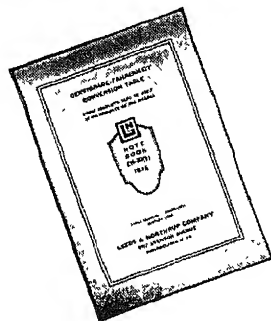
ENGINEERING

Material May Cut Danger From Electrical Failure

➤ LESS danger from fire and electrical failure, especially on ships, was forecast from the development of a new material with high insulation value even when wet.

The new material, a glass cloth laminate, was developed by the Princeton University Plastics Laboratory for the U. S. Navy Bureau of Ships and the U. S. Signal Corps. Prof. Louis F. Rahm, director of the laboratory, predicts that the new development will be used in the manufacture of electrical components for marine installation.

Science News Letter, January 24, 1948



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• New Machines and Gadgets •

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask Gadget Bulletin 398. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

✿ **EGG CRACKER** and holder permits the opening and eating of soft boiled eggs without burnt fingers or mess. It is a plastic device in two parts; one is the egg-holder, the other fits over the top end and cuts the shell by means of sharp-pointed strips squeezed inward by the fingers.

Science News Letter, January 24, 1948

✿ **BARREL TILTER** and support, a home-made affair for an oil or gasoline barrel, is a box-like frame of welded pipe which has one side and end made of curved piping. A barrel placed against two parallel straight sides can be raised and tilted to a horizontal position by means of the curved sides.

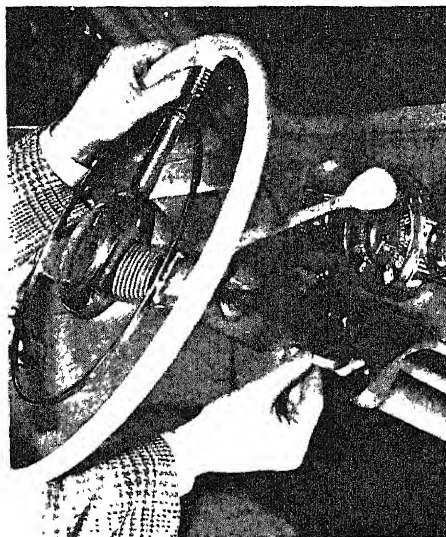
Science News Letter, January 24, 1948

✿ **SPECIAL LENS**, fitted with brackets to slide under the home television receiver, will magnify the picture of the television screen about three times without decreasing its brightness, according to claims. The lens may be adjusted vertically and horizontally to produce the desired picture size.

Science News Letter, January 24, 1948

✿ **TANK-TYPE DEVICE**, installed in the hot-water line to deliver a rust-inhibiting chemical to the water, prevents damage to clothing in the washing from rusty water. The chemical used is a modified form of Calgon, sodium hexametaphosphate.

Science News Letter, January 24, 1948



indicator holds in position indefinitely, making exact readings possible.

Science News Letter, January 24, 1948

✿ **LABORATORY FLOOR TRUCK**, for carrying carboys of acids or tanks of compressed gases, holds the container in an upright or tilted position as desired. Its carrying rack with its nose plate base pivots on the truck's axle and can stand upright or rest back against the handle bars.

Science News Letter, January 24, 1948

✿ **ALUMINUM SHEATH** for telephone cables, to supplement the familiar lead-covered cable, is a thin sheet of the metal covered with rubber-like flexible black plastic. It will be made in sizes ranging from small cables to those containing hundreds of pairs of wires.

Science News Letter, January 24, 1948

✿ **CIGARETTE DISPENSER** and lighter, for use in an automobile as shown in the picture, drops a single cigarette into a small trough with a single pressure on a lever. In the trough, it is held by a spring against a hot filament and in four seconds is lighted.

Science News Letter, January 24, 1948

✿ **RUBBER HARDNESS GAUGE**, size and shape of a fountain pen, is operated when an indenter at one end is pressed firmly against the rubber surface. It has no cams, gears, levers or pivots to get out of order, and the gauge

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Question Box

DENTISTRY

What tests are being made to prevent tooth decay? p. 54.

MEDICINE

How has a new drug extended the usefulness of the mold remedies? p. 55.

How may infants be saved from being born with defects? p. 53.

How was a Science Service story instrumental in getting money to promote cancer

research? p. 51.

What does the new blood center, just opened, hope to accomplish? p. 52.

What is V14A? p. 60.

CHEMISTRY

How have candies been made into better-balanced foods? p. 54.

ZOOLOGY

How does man's life-span compare with other warm-blooded animals? p. 58.

Photographs: Cover, Buffalo Museum of Science; p. 51, p. 54, p. 58, Fremont Davis; p. 53, Dr. Charles J. Lyon; p. 55, Dr. T. D. Fontaine.

You Can Have "Spring in January" With These Exciting Plant Experiments



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Anyone can learn about growing things and some of the principles of agricultural science by experimenting with this kit. The plants you raise will not lower the high cost of living but they will increase the pleasure of learning. Send for this kit today so you can get started on soilless gardening as a hobby.

Young and old alike will enjoy this complete outfit for hydroponics. There is nothing else to buy. It contains everything needed to start growing fruits and flowers. Pots are easily assembled, chemicals to feed growing plants, shiny mica material for roots to cling to, seven kinds of specially selected seeds. Grow seedless fruit, sprout roots on stems, experiment with colorful plastic tents for light-growth.

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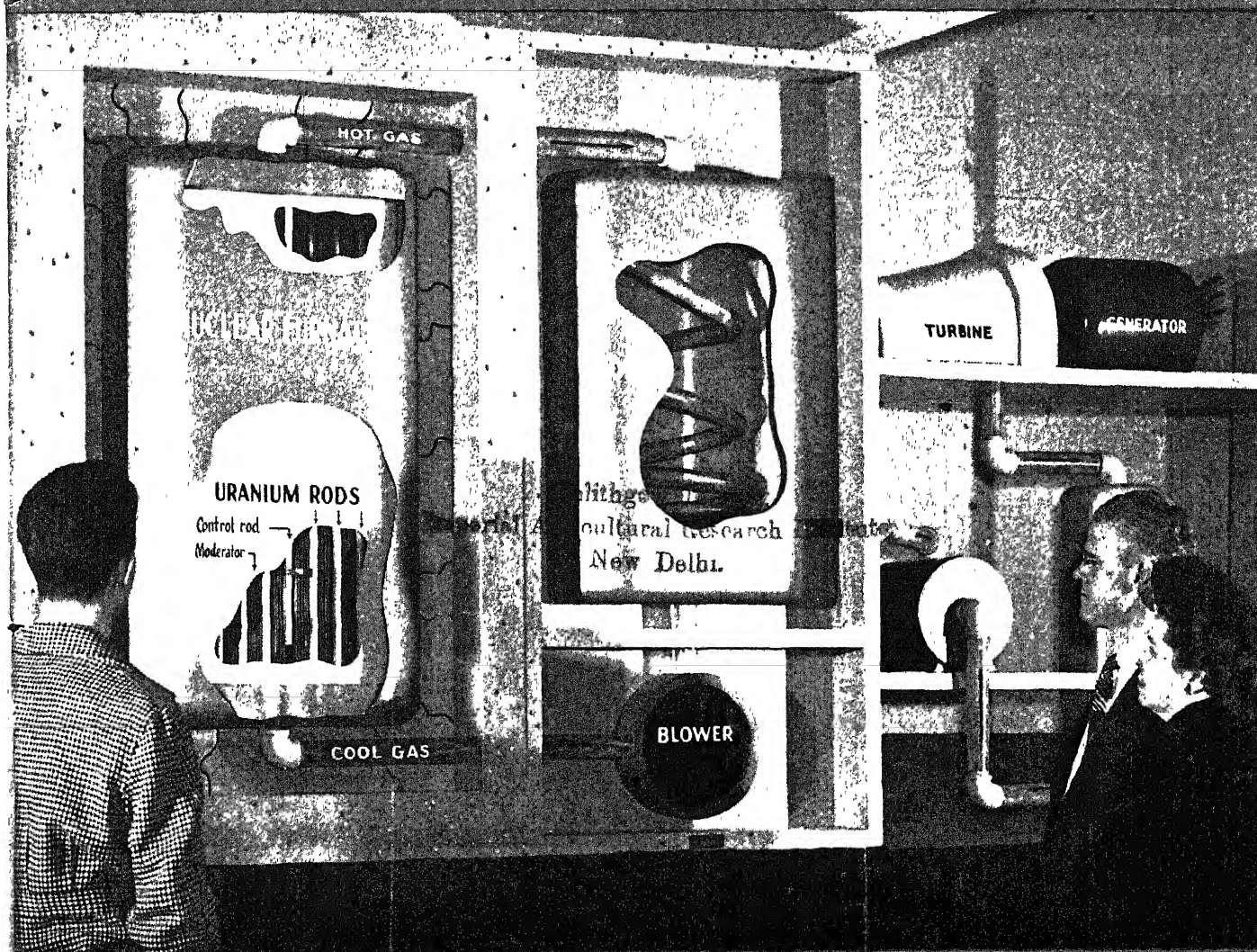
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SCIENCE NEWS LETTER

Vol. 53, No. 3

THE WEEKLY SUMMARY OF CURRENT SCIENCE • JAN. 31, 1948



Atomic Power?

See Page 69

A SCIENCE SERVICE PUBLICATION

GENERAL SCIENCE

40 Winners Are Selected

Eight girls and 32 boys (proportion determined by ratio of boys and girls entering the contest) are being invited to Washington, D. C., for an all-expense trip February 27 through March 2, 1948, to attend the Science Talent Institute. Here one boy and one girl will be awarded \$2,400 Westinghouse Grand Science Scholarships. Eight winners will be awarded \$400 Westinghouse Science Scholarships and \$3,000 additional in scholarships will be awarded at the discretion of the judges.

ARIZONA

Phoenix Coe, Elmon Lee 16 North Phoenix High School

CALIFORNIA

Glendale Dibble, William Edwin 17 Herbert Hoover High School
Los Angeles Childress, Patricia Lee 17 Alexander Hamilton High School
Van Nuys Johnston, Alan Robert 16 Van Nuys High School

COLORADO

Denver Berry, Richard Stephen 16 East High School

CONNECTICUT

Greenwich Wilcox, Charles Frederick, Jr. 17 Greenwich High School

ILLINOIS

Chicago Decker, Charlotte Elizabeth 17 Senn High School
Evanston Kende, Andrew Steven 15 Evanston Township High School
Oak Park Geller, David Melville 17 Oak Park Township High School

INDIANA

Terre Haute Sawyer, Millicent Margaret 17 Wiley High School

MASSACHUSETTS

Boston Yphantis, David Andrew 17 Public Latin School
Zisk, Stanley Harris 16 Public Latin School

MICHIGAN

Lansing Poindexter, Edward Haviland 17 J. W. Sexton High School

MISSOURI

St. Louis Rodemich, Eugene Richard 16 Beaumont High School

NEW JERSEY

New Brunswick Camamis, George 17 New Brunswick Senior High School
Rahway Breslow, Ronald Charles 16 Rahway High School

NEW YORK

Brooklyn Howett, Gerald Leonard 16 Abraham Lincoln High School
Schlichta, Paul Joseph 18 Brooklyn Preparatory School
Teager, Herbert Martin 17 Midwood High School
Floral Park Jamieson, John Burgess 17 Sewanhaka High School
Flushing Mazo, Robert Marc 17 Flushing High School
Forest Hills Baraff, Gene Allen 17 Forest Hills High School
Blumenheim, Ursel Joyce 16 Forest Hills High School
Wolff, Barbara Claire 17 Forest Hills High School
New York Kohn, Kurt William 17 Bronx High School of Science
Schneider, Walter Julius 17 Bronx High School of Science
LeSchack, Alan Richard 16 Stuyvesant High School
Martin, Paul 16 Stuyvesant High School
Rayna, Gerhard 17 Stuyvesant High School
Rockville Centre Maurer, Laura Caroline 17 South Side High School
Staten Island Lubin, Michael David 16 Tottenville High School

OHIO

Canton Miller, Jerry Blair 17 Lincoln High School
Rowe, Nancy Jean 16 Lincoln High School
Liberty Center Rigal, R. Daniel 17 Liberty Center Village High School
Logan Schaad, Lawrence Joseph 17 Logan High School

OREGON

Springfield Peacock, Roy Norman 17 Springfield Union High School

PENNSYLVANIA

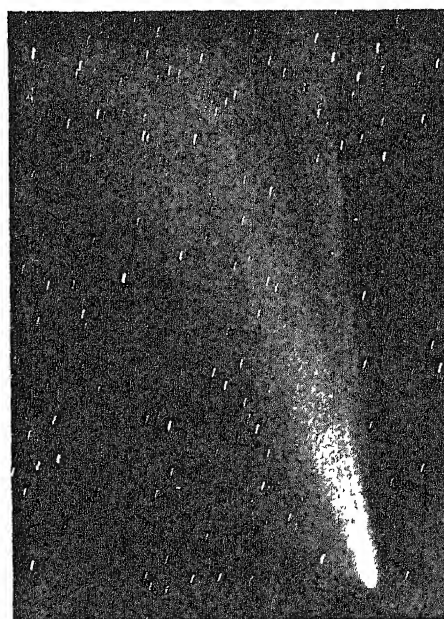
Pittsburgh Alexeff, Igor 17 Mt. Lebanon High School

SOUTH DAKOTA

Sioux Falls Richardson, James Wyman 17 Washington High School

WISCONSIN

Brodhead Gilbert, Marjorie Ann 17 Brodhead High School
Madison Koehler, George Edgar 17 West High School



COMET 1947 n—Although no longer visible to the naked eye, this great comet is still being followed with interest by astronomers.

ASTRONOMY

Comet 1947 n Was Not "Double-Headed" Comet

➤ COMET 1947 n, that spectacular comet seen in the southern skies by many observers, was not a "double-headed" comet. Instead of actually splitting into two parts, a second faint nucleus developed inside the head of the comet and gradually receded from the primary nucleus.

So far, at least, the creation of this second nucleus has not lead to any disruption of the cometary mass, Dr. J. S. Paraskevopoulos, superintendent of Harvard's South African Station, states. The double nucleus was observed as early as December 10 by Dr. W. H. van den Bos of Union Observatory, Johannesburg, South Africa.

The double nucleus and its many tails made Comet 1947 n particularly interesting, both to amateurs and astronomers. Multiple tails have been observed in many bright comets, but two nuclei are quite rare and of greater significance.

Since its discovery early in December by an unnamed observer on a ship at sea, this bright comet has faded considerably. It can no longer be seen with the naked eye and the grandeur of its tails is gone.

Science News Letter, January 31, 1948

GENERAL SCIENCE

Future Leaders in Science

Eight girls and 32 boys have been invited for an all-expense visit to Washington to compete in the finals for scholarships totaling \$11,000.

► FORTY future leaders in American science—eight girls and 32 boys—have been invited for a five-day, all-expense visit to Washington. While at the annual Science Talent Institute, they will undergo final selection for the Westinghouse Science Scholarships in the Seventh Annual Science Talent Search conducted by Science Clubs of America, administered by Science Service.

The 40 trip-winners were chosen by a panel of judges after a nation-wide competition in which top-ranking seniors in all the public, parochial and private high schools in the continental United States were invited to participate. Entrants, representing every state in the Union, totaled 16,412, of whom 3,161 completed the stiff science aptitude examination, submitted recommendations and scholarship records and wrote an essay on "My Scientific Project."

At the end of their five-day stay in Washington, Feb. 27 through March 2, the judges will announce the winners of the scholarships. One girl and one boy will each receive a \$2,400 Westinghouse Grand Science Scholarship (\$600 a year for four years). Each of eight additional winners will get a \$400 Westinghouse Science Scholarship (\$100 a year for four years). In addition, \$3,000 in Westinghouse Science Scholarships will be awarded at the discretion of the judges.

Have Choice of Schools

Winners of these scholarship awards may enter any college, university or technical school of their choice.

Chosen without regard to geographic distribution, the 40 trip-winners come from 30 localities in 16 states. One state, South Dakota, this year sends a winner to Washington for the first time. This brings to 35 the total of states that have been represented by winners.

Five high schools in the United States have produced more than one winner each this year. Five of the boys will come from New York City: three from Stuyvesant High School and two from the Bronx High School of Science. Forest Hills (N. Y.) High School will send two girls and one boy, and Lincoln High School in Canton, Ohio, will send one

girl and one boy. There will be two boys from the Public Latin School in Boston.

A number of high schools throughout the country represented in this year's list of Science Talent Search winners have produced one or more winners in previous competitions. There have been nine from the Bronx High School of Science, and five from Stuyvesant High School. There have been three each from Herbert Hoover High School at Glendale, Calif., West High School at Madison, Wis., and Forest Hills (N. Y.) High School; two each from Alexander Hamilton High School at Los Angeles, Evanston Township (Ill.) High School and Oak Park Township (Ill.) High School, and one each from Midwood High School at Brooklyn, N. Y., and Sewanhaka High School at Floral Park, N. Y.

All of the winners live at home and attend their local or nearby public, parochial or private high schools.

High Standing in Class

Half of the Science Talent Search trip winners rank first, second or third in their graduating classes, which range in size from 31 to 750 students. Approximately 62% of the winners' fathers and 52% of their mothers attended colleges.

These trip-winning students are not in the "greasy grind" category; most of them have a wide variety of outside activities. At least eight are presidents or other officers in science clubs affiliated with Science Clubs of America.

Many of the fortunate 40 have already chosen the lines of study and research they wish to pursue. Theoretical physics attracts 12; two hope to enter medicine; nine intend to take up chemistry, either for research or for engineering applications; four want to go into biochemistry. Others indicate interest in mathematics, astronomy, engineering, genetics and biology.

Judges of the Science Talent Search are: Dr. Harlow Shapley, Director of the Harvard College Observatory and president of Science Service; Dr. Harold A. Edgerton and Dr. Stuart Henderson Britt, psychologists of New York City, and Dr. Rex E. Buxton, psychiatrist of Washington D. C. Drs. Edgerton and

Britt design the Science Aptitude Examination each year for the Science Talent Search.

In addition to the 40 trip-winners who will attend the Science Talent Institute in Washington, an Honorable Mentions list of 260 in the Seventh Annual Science Talent Search will be announced. These high-ranking contestants will be recommended to colleges and universities for their science aptitude. If they are as fortunate as those previously included in the Honorable Mentions list, they will receive offers of scholarships from many institutions of higher education.

Activities of Past Winners

Most of the winners in the six Science Talent Searches held since 1942 are now students in colleges and universities where they are preparing themselves for scientific careers. Many have already completed the four-year course leading to the bachelor's degree, and six will soon become Ph.D.'s. A few are already engaged in full-time jobs in industry or on university teaching or research staffs. None of the 240 previous winners is more than 24 years old.

Scholarships are provided and the Science Talent Search made financially possible by the Westinghouse Educational Foundation, an organization endowed by the Westinghouse Electric Corporation, for the purpose of promoting education and science.

Through an arrangement with the State Academies of Science, 11 states are conducting state Science Talent Searches concurrently with the national competition. In these 11 states all entries in the national Science Talent Search will be turned over to state judging committees. From their entries they will choose state winners and award scholarships to various colleges and universities. Cooperating states are: Alabama, Georgia, Illinois, Indiana, Iowa, Louisiana, Minnesota, Montana, Pennsylvania, Tennessee and Virginia.

Science News Letter, January 31, 1948

ARCHAEOLOGY

African Expedition Finds Fossils of Late Stone Age

► POLISHED stone implements of Late Stone Age men, together with fossil animals, have been found by the Egyptian party of the University of California African Expedition along the shores of a now-dry Neolithic lake.

The finding, made by Dr. S. A. Hu-zayyin, archaeologist of Farouk I University and a member of the expedition

staff, was reported at the expedition's headquarters at Kom Oshim near Cairo in the Faiyum Desert.

The recovery of Stone Age artifacts together with fossil animals will make it possible to reconstruct the life and con-

ditions of this period, and possibly necessitate a redating of the lake, Dr. Huzayin said.

The fossil specimens include hippopotamus, wart hog, gazelle, large antelope, elephant, crocodile, turtle, and fish.

Science News Letter, January 31, 1948

GENERAL SCIENCE

17 Expeditions Planned

Scientists of the Chicago Natural History Museum will go to Bermuda to study sea life, to Burma to collect birds, to Peru and Bolivia to collect plants.

► **STRANGE** creatures from more than a mile under the surface of the ocean off Bermuda, fossils of invertebrates 450,000,000 years old from the mountains of Pennsylvania, birds from Burma and insects from Guatemala are a few of the prizes which scientists from the Chicago Natural History Museum plan to collect this year.

In all, 17 expeditions at locations ranging from Africa to Arkansas and from Alaska to Burma will make studies and collect specimens.

The three-month Bermuda Deep-Sea Expedition will start work June 1, under the joint sponsorship of the museum and the Bermuda Biological Station for Research, Inc., St. Georges, Bermuda. The "Caryn," a 98-foot ketch loaned to the Bermuda station by the Oceanographic Institution of Woods Hole, Mass., will be used by the expedition to study sea life at depths of from 8,000 to 12,000 feet.

Loren P. Woods, curator of the museum's division of fishes, will be leader of the expedition, with Dr. Dugald E. S. Brown heading the Bermuda group.

Another large expedition will be the museum's archaeological expedition to the Southwest, where a large staff will continue excavations of prehistoric Indian sites. Dr. Paul S. Martin, chief curator of anthropology, will lead.

The Rush Watkins Southeast Asia Expedition will leave Chicago in September to collect birds in Burma. Mr. Watkins, a Chicago businessman, and Dr. Austin L. Rand, the museum's curator of birds, will conduct the work. Melvin A. Traylor, Jr. museum associate, will head another ornithological expedition which will collect Mexican birds in the Mt. Orizaba region, beginning in June.

Eugene S. Richardson, curator of invertebrate fossils, will collect invertebrates of the Ordovician period in the mountains of Pennsylvania, while Dr. Rainer Zangerl, curator of fossil reptiles,

will conduct a search for specimens of prehistoric reptiles and amphibians in the Alcova formation of central Wyoming.

Four botanical groups will be in the field. Dr. Hugh C. Cutler, curator of economic botany, will spend several weeks next month in Cuba with Dr. B. E. Dahlgren, curator emeritus of botany, who is studying palm genetics. In April, Dr. Cutler will fly to Peru and Bolivia to collect plant specimens in those countries. Paul C. Standley, curator of the museum's herbarium will collect botanical specimens in Central America, beginning in September, while Dr. Francis Drouet, curator of cryptogamic botany, will at the same time collect mosses, seaweeds and other specimens in coastal areas of the Gulf of Mexico from Louisiana to Florida.

Harry Hoogstraal, assistant curator of insects, is in Africa with the University of California expedition, and Rupert L. Wenzel, assistant curator of insects, will leave in April for Guatemala where he will collect insects for the museum.

Mammal specimens from the state of Arkansas will be studied by Colin C. Sanborn, curator of mammals, starting in March, while the assistant curator of mammals, Philip Hershkovitz, will leave in October for Colombia to begin a year of mammal collecting in that country.

Dr. Robert Kriss Wyant, curator of economic geology, and Harry Changnon, curator of exhibits, will collect ores in the Black Range Mountains, N. Mex., and Dr. Sharat K. Roy, chief curator of geology, will continue his field study in the Adirondack Mountain areas of New York, New Hampshire and perhaps Massachusetts.

Material for use in a habitat group of the precious sea otter will be collected in Alaska this summer by Frank Wonder, staff taxidermist.

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TECHNOLOGY

Short Length Nylon Fibers Make Wool-Like Garments

► **LADIES'** stockings, more sheer than any you have seen, and warm, wool-like socks for men, both made of nylon, were displayed at the DuPont plant in Seaford, Del.

Other all-nylon products shown were: woolly sweaters, soft blankets, upholstery and felt.

Some of these new nylon developments are made possible by cut-to-length, staple nylon. The synthetic fibers are stretched, crimped and cut into lengths of two or three inches. Instead of the sheer fabrics such as are produced from

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long, continuous-filament nylon, the short length fibers can be used to create soft, warm garments which resemble wool. This process is opening up a vast new field for synthetic fiber. Used alone or blended with wool, silk or rayon, it is giving greater variety in fabrics and more durable ones.

Both the sheerest of sheer ladies' stockings and woolly, nylon men's socks have been produced only experimentally. The sheerest stockings are 10 denier, compared with 15 or 20 for most nylons.

Nylon itself is still in its infancy. It was first introduced to the public less than ten years ago. Not in the form of stockings but as toothbrush bristles was it first placed on the market. Nylon

stockings did not appear until May 15, 1940.

Strength along with elasticity are nylon's two most important properties. Today, this fiber, a favorite with fastidious ladies, is proving its popularity in many fields. Polo shirts, jockey caps and football pants are made of it. Nurses find that uniforms of nylon save laundry bills. Nylon linings in fur coats outwear the fur. The fabric makes excellent laundry nets. Blouses, slips, panties and foundation garments are only a few of the newly-approved uses of this synthetic fiber, that in less than a decade has begun to play such a vital role in the fabric industry.

Science News Letter, January 31, 1948

California showed that streptomycin controlled pneumonic plague, the most deadly form of the disease, in 90% of mice. But its effect on human plague patients remained to be proved.

Science News Letter, January 31, 1948

NUCLEAR PHYSICS

Atomic Energy Exhibit Biggest of Its Kind in U. S.

See Front Cover

► JOHN Q. PUBLIC is invited to view the biggest atomic energy exhibit ever provided the American people at the American Museum of Natural History in New York City.

Sponsored by the Brookhaven National Laboratory to promote individual understanding of nuclear science developments, the exhibit utilizes models, demonstrations, talks, movies, large panel diagrams presenting fundamental atomic facts, photomurals and other devices to show the great values of nuclear energy in scientific research.

A model power plant, shown on the cover of this week's SCIENCE NEWS LETTER, demonstrates how an atomic pile may some day be used to generate electric power. Nuclear fission releases great

Plague Patients Saved

Streptomycin was given to five dying patients after other treatment proved futile. First sign of improvement was seen within 36 hours.

► FIVE patients dying of plague, one of the most fatal of all epidemic diseases, are alive and well today, thanks to streptomycin. They are living proof of the hopes held by medical scientists that the great disease conqueror from an earth mold would prove effective against this scourge of the centuries.

The patients were victims in a plague outbreak in the Madras Presidency, India. Their rapid recoveries under streptomycin treatment are reported by the Anantapur medical officer, P. V. Karamchandi, and the medical officer of the Hindupur Plague Hospital, K. Sundar Rao, in the medical journal, *Lancet*, (Jan. 3.)

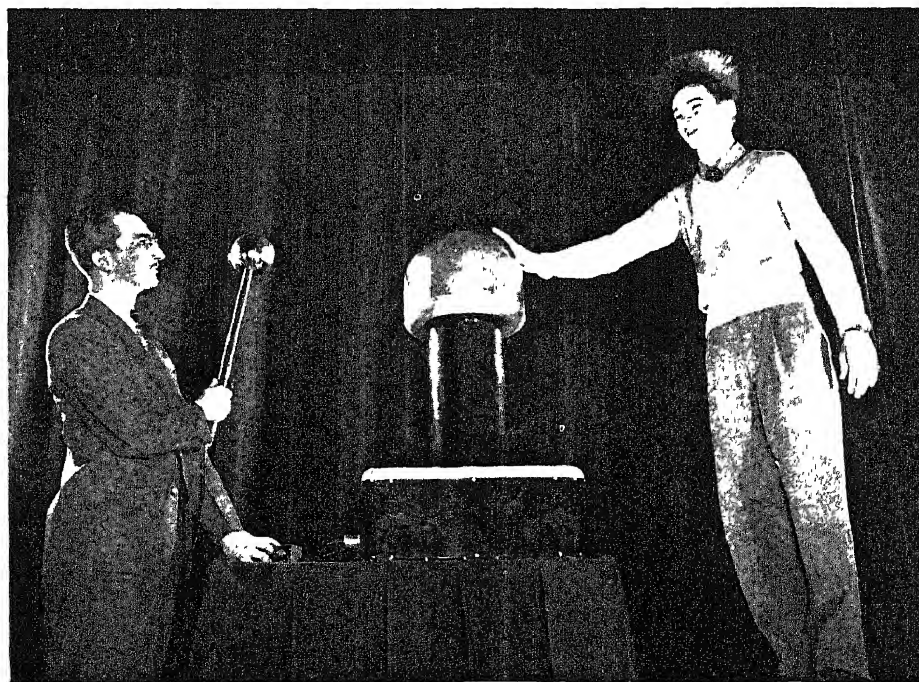
The five young patients had temperatures as high as 106.6 degrees Fahrenheit, swollen glands, were semi-conscious and had a dangerously low rate of breathing. Plague germs were discovered upon puncture of the enlarged glands.

Sulfa drugs, found partly effective in checking plague in China, were given to the first three of the patients but did not help. So streptomycin was tried. Within 36 hours after the start of this treatment the patients became conscious and recovery followed rapidly.

"Streptomycin appears to be a potent drug for the treatment of human plague," the Indian medical officers report.

No bad effects were observed from the drug.

The lowly laboratory mouse first pointed the way to check-mating the Black Death. In the early part of 1947, Dr. Karl Meyer of the University of



MAKES YOUR HAIR STAND ON END—By touching the dome of this model Van de Graaff electrostatic generator, used in nuclear processes, the young man on the right got a shock of static electricity which made his hair rise vertically. This is one of several scientific instruments being shown at the atomic energy exhibit.

heat which may be transformed into steam to drive electric generating machinery.

The exhibit, which opened on Jan. 21,

will remain in New York until April 5 and then be displayed in other cities in the Northeastern and Middle Atlantic states.

Science News Letter, January 31, 1948

MEDICINE

Early Attack Might Cure

Possibility of curing Hodgkin's disease and lymphosarcoma depends on early diagnosis and aggressive treatment before the diseases have spread.

➤ **EARLY** diagnosis and early aggressive treatment might lead to cure of Hodgkin's disease and lymphosarcoma, at least in some cases, Dr. Lloyd F. Craver of Memorial Hospital, New York, declares in the *Journal of the American Medical Association* (Jan. 24).

He cites the case of five patients with Hodgkin's disease treated at Memorial Hospital who survived five to 11 years, two patients treated in England with survivals of 10 and 12 years respectively, and survival rates in lymphosarcoma of from 23 to 52 out of 100 patients.

The possibility of curing these two diseases, which hitherto have been regarded as incurable, depends primarily on whether they start from a single spot in the body, as cancer does, or from many. If they start from only one spot, early treatment should make a cure possible. The evidence for this possibility, Dr. Craver states, is accumulating.

In Hodgkin's disease, he reports, it has long been his experience that outstanding among those cases with long survivals and long periods of freedom from disease have been those in which the disease has been treated fairly aggressively while it is still early and localized.

Treatment of such early cases consists in removal, by operation, of the involved lymph gland or node, and X-ray treatment.

Chemical treatment in the form of nitrogen mustards and radioactive isotopes of phosphorus, sodium, manganese or gold have so far been useful only for relieving symptoms. While the nitrogen mustards sometimes give striking results in Hodgkin's disease the improvement is "disappointingly brief" in many cases.

With his plea for early recognition and treatment of Hodgkin's disease and lymphosarcoma, Dr. Craver gives some early signs.

An enlarged lymph node or gland, for example those in the neck which are

frequently thought to be the result of a cold or sore throat, should be considered a danger signal if it does not subside in three weeks.

Cough, a feeling of pressure under the breast bone, fullness at the base of the neck, puffiness of the eyes on arising, wheezing and labored breathing are symptoms calling for careful examination to make sure they are not due to Hodgkin's disease or lymphosarcoma.

A solitary lump in a woman's breast may not be a cyst or a cancer but the first sign of lymphosarcoma.

A slightly thickened pink or purplish plaque in the skin, especially of the scalp, may be a first sign of lymphosarcoma.

A thickening in and about the tear gland and the conjunctiva of the eyes, a change in bowel habit or other stomach and intestinal symptoms, and bone symptoms are other danger signals Dr. Craver gives for Hodgkin's disease and lymphosarcoma.

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Russian Tip on Vitamin May Lead to New Industry

➤ **DESPITE** iron curtains and diplomatic impasses, useful scientific information still circulates from nation to nation. Russian scientists are credited by chemists of the U. S. Department of Agriculture with a discovery that may mean a new million-dollar industry in this country.

The Russians, states Dr. L. B. Howard, chief of the Bureau of Agricultural and Industrial Chemistry, reported discovery of large amounts of ascorbic acid, or vitamin C, in green walnuts. Government chemists, quickly following up this lead, found the vitamin not only in green English walnuts but in the discarded hulls of ripe nuts, and developed a method for extracting it in pure crystalline form.

There are enough walnut hulls in California after each harvest to yield about 125,000 pounds of recoverable ascorbic acid, worth nearly \$1,500,000 at present prices. Further work is now in progress to arrive at an economic evaluation of walnut hulls as a commercial source of the vitamin.

English walnuts, incidentally, are not English but Persian in origin. They are more extensively grown now in California than they ever were in ancient Persia.

Science News Letter, January 31, 1948

ASTRONOMY

Astronomers Take First Peek With Giant Telescope

➤ A **PEEK** deeper into cosmic space has been granted astronomers by the giant telescope of Palomar. Many such preliminary "looks" into space beyond the reach of all other telescopes will be necessary as final adjustments are made on the new 200-inch telescope. Officials hope that the world's largest telescope can begin work on its important research program by June.

Test observations, both visual and photographic, have been made to try the mirror rather than to study some heavenly object of particular importance. A great deal of work remains to be done in adjusting the support system, the driving mechanism and so on. Some of the auxiliary mirrors have not yet been completed or installed.

The first project to be assigned the telescope atop Mount Palomar has not yet been decided. It will concern, in general, the relative abundance of chemical elements in stars, the structure and behavior of the universe as a whole, or it may possibly be an attempt to get a snap shot of Mars. This latter, though of great popular interest, is considered the least important.

The three respects in which this telescope is expected to surpass all others are: 1. resolving power. 2. dispersion. 3. space penetration. The first of these would lead to further evidence concerning the canals of Mars; the second to more information about the abundance of the elements in the universe; the third to knowledge about the distribution of the galaxies, those systems of billions of stars like the Milky Way system of which the earth is a part.

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At least 12 *gas-turbine* electric locomotives are being designed in America, Great Britain, Switzerland and France.



TESTING GI SHOES—Longer-wearing footwear for civilians and Army is expected from the experiments made at the shoe track at Camp Lee, Va. Here a soldier is shown in the process of testing new shoes on mud and log traction slides. As a result of this program a type I leather-soled shoe was found early in the war to last 150 miles while a recent type III shoe, using synthetic rubber material in the sole, has a life expectancy of 2,500 miles.

GEOLOGY

Find Bikini Is Very Old

It is estimated to be more than 20,000,000 years old from the holes drilled through the coral. Need 10,000-foot hole to reach basement rock.

➤ BIKINI atoll has been a-building for more than 20,000,000 years. That much can be stated on the basis of the deep holes drilled there last summer. How much older this submerged mountain of coral may be cannot be determined until a far deeper hole—perhaps 10,000 feet—is bored, reaching to the still-unknown basement rock beneath the coral.

In the journal, *Science*, (Jan. 16), Dr. H. S. Ladd and J. I. Tracey of the U. S. Geological Survey and G. G. Lill of the Office of Naval Research tell of the five holes bored on the atoll to find out what it is made of. To the bottom of the deepest one—2,556 feet—it was all coral, mostly rather loose and soft. Earlier records made by seismographs indicate that much farther down, at depths between 6,000 and 13,000 feet, the solid basement rock begins. This is presumably basalt.

The top few hundred feet as shown by samples taken with core drills, is geo-

logically recent—that is, it does not go as far back as the beginning of the latest Ice Age, a million years or so ago. Pre-Ice-Age fossils belonging to the Tertiary epoch were found at 930 feet.

From 1,790 feet to as far down as the drill went, the limestone was definitely of early Miocene age, which puts it well down into the Tertiary. Years do not mean much here; a good guess is about 20 millions.

The cylindrical limestone samples brought up by the core drills have all been deposited with the National Museum in Washington.

Dr. Ladd and his associates express the hope that a 10,000-foot hole may be drilled in the middle of Bikini lagoon, to reach basement rock. They propose to sink a barge onto the top of a coral pinnacle in the lagoon, for use as a working platform for the drilling apparatus.

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NUCLEAR PHYSICS

Man Is More Vulnerable Than "Bugs" to Radiation

➤ "BUGS" will have a better chance to survive than man in an atomic war.

This was pointed out by Dr. Douglas M. Whitaker, dean of the Stanford School of Biological Sciences, who last summer was a member of a scientific expedition to Bikini Atoll.

Dr. Whitaker stated that bacteria and lower forms of plant and animal life tolerate vastly greater quantities of radiation than man.

"If man should eliminate himself from the earth, which is highly unlikely," he continued, "these lower forms may still be expected to persist on earth."

Radiation damage to cellular tissue, whether it be that of plants or animals, is closely tied to the process of growth, Dr. Whitaker stated.

"The bodies of plants and animals, including man, are composed of microscopic units called cells. Growth takes place when these cells increase their number by division.

"When cells are in the act of dividing, they are much more easily damaged by an adverse influence, including penetrating radiation, and for this reason we find that atomic radiation selectively damages those tissues of the body which are undergoing rapid cell division.

"This includes developing embryos, the germ cells in testes or ovaries, and blood cells—both red and white.

"Accordingly, abnormal embryos may be produced, and in the adult body, sterility, anemia, and inability to combat diseases due to lack of white blood cells commonly result from irradiation.

"If the dosage is small, recovery will be complete, but death results from large doses."

Dr. Whitaker also noted that the disfiguring scars characteristic of radiation burns are due to the fact that heat from atomic radiation cooks the skin or the entire body at close range.

"Even more important, however, than these damages to the individual are the hereditary changes, known as mutations, that are induced by radiation in the nuclei of cells," he continued.

"Mutations in spermatozoa or eggs are passed on to succeeding generations, and the vast majority are of a sort to cause damage and abnormalities.

"Most of them, however, will not appear until the second or third succeeding generation."

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ASTRONOMY

First Comet of 1948 Has Been Discovered

➤ THE first comet of 1948 has been discovered. A faint new one, it was spotted in the constellation of Hercules.

Of the tenth magnitude and thus far too faint to be seen with the naked eye or binoculars, the comet has a noticeable tail. It is heading northeast.

Comet "1948 a" will be known as Comet Mrkos after its European discoverer, Antonin Mrkos. It was spotted at 4:40 a.m. Greenwich Civil Time on Jan. 18, or shortly before midnight Eastern Standard Time, Jan. 17, according to Dr. Antonin Becvar, director of the Astrophysical Observatory at Skaluate Pleso, Czechoslovakia, who himself discovered a new comet last year. Its discovery was announced in a cablegram from Miss J. M. Vinter Hansen of Copenhagen University Observatory, to Harvard College Observatory, clearinghouse for astronomical information in the Western Hemisphere.

When found the comet's right ascension was 16 hours, 41.8 minutes, its declination plus nine degrees, 45 minutes. Its daily motion is plus three minutes 32 seconds in right ascension, plus 28 minutes in declination.

Science News Letter, January 31, 1948

Miniature Geiger Counter Designed for Close Work

➤ A GEIGER counter with a tube only one inch long and less than that in outside diameter has been designed by Drs. Nello Pace, Robert Loevinger and Enrique Strajman of the University of California. It is designed for measuring radioactivity from single organs, or even parts of large organs, in man and the larger animals.

Details of its construction and use are given in the journal, *Science*, (Jan 16).

Science News Letter, January 31, 1948

ORTHOPEDICS

Hip Bone Yields Better Grafts Than Leg Bone

➤ BONE grafts taken from the hip, or iliac, bone make better grafts than those taken from a leg bone, Dr. I. S. McReynolds of Houston, Tex., declared at the meeting of the American Academy of Orthopedic Surgeons in Chicago.

"Iliac bone is meshy and porous and thus allows better contact with the body fluids which nourish the transplanted

bone," he explained. "This meshy type of bone contains large numbers of bone-forming cells and when used as small chip grafts some of the transplanted chips survive immediately, begin to grow, and form new bone."

Grafts from hip bones are less liable to infection, he added.

Fewer serious complications occurred when grafts were taken from the hip than when taken from the leg bone. Frequently the leg bone, from which a graft has been taken, breaks, Dr. McReynolds said.

In one study during the war iliac bone was used in 65 operations over a four-year period with only three known failures of the iliac bone grafts.

Science News Letter, January 31, 1948

ANTHROPOLOGY

World's Most Valuable Fossils Shown in New York

➤ THE world's most valuable collection of early human and pre-human remains has been opened to the public at the American Museum of Natural History in New York. It consists of fossils representing a giant ape-man, *Gigantopithecus*, a half-million-year-old giant who was undoubtedly human, *Meganthropus*, and an ordinary-sized human being only a quarter of a million years old, *Homo soloensis*. With them, for comparison, is the skull of a primitive Australian bushman.

The priceless fossils were all found in Java shortly before the war by a German-born citizen of the Netherlands, Dr. G. H. R. von Koenigswald. After enduring Japanese captivity until after VJ day, he brought his rescued treasures to this country a little over a year ago. At the end of their showing in New York, they will be taken to the Netherlands, since they are all the property of that country's government.

The *Homo soloensis* skull has been given the nickname of "Hirohito's birthday present" because it was taken to Japan during the war, found in the Emperor's palace by a young American officer, and brought back to this country to rejoin its "family." This human species is regarded as an Asiatic cousin of *Homo neanderthalensis*, the famous Neanderthal man of Europe.

In all, 11 of these Solo skulls were found, in the valley of the Solo river, all in one place. No skeletal bones were found, and all the skulls had holes in them. It looks like the world's number one "whodunit."

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BACTERIOLOGY

Bacteria, Fungus Spores, Caught in High Arctic Air

➤ FRESH evidence that bacteria and the spores of fungi are carried by high-altitude winds in Arctic regions has been obtained by three McGill University biologists, Prof. Nicholas Polunin, Prof. S. M. Pady and Prof. C. D. Kelly of Montreal. Sticky-coated glass plates and microscope slides were held out of the window of a plane flying at 5,000 feet at regular intervals during a flight from Victoria Island, off the Arctic coast of Canada, to Edmonton, Alberta. Subsequent growth of the bacteria, and germination of the spores, proved them to be alive.

The only previous high-altitude germ collection of this kind made in the Arctic was a series taken by Col. C. A. Lindbergh over Greenland in 1933. Unfortunately, the results of this earlier collection were never fully evaluated, because the biologist who had undertaken to do so, Dr. Fred C. Meier of the U. S. Department of Agriculture, lost his life in an air crash before he could complete the work.

The three McGill scientists announce preliminary results in the British journal, *Nature* (Dec. 20, 1947), and state that details will be published elsewhere at a later date.

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Chemical Test for 2,4-D Gives Wine-Purple Color

➤ A NEW chemical test for the presence of the weed-killer, 2,4-D, in extremely small amounts has been developed by Prof. Virgil H. Freed of the Oregon Agricultural Experiment Station.

The material suspected of carrying the plant poison is first thoroughly dried in a test tube. A few crystals of chromotropic acid are placed with it, then a small amount of concentrated sulfuric acid.

The tube is then heated carefully for about two minutes. If 2,4-D or one of its close chemical relatives is present, the liquid changes color to pink or wine-purple.

Science News Letter, January 31, 1948

E FIELDS

MEDICINE

Night Attacks of Asthma Relieved with New Drug

➤ A NEW synthetic drug which holds promise of relieving the night suffering of asthma-afflicted persons is reported by Dr. Milton M. Hartman of San Francisco in the *Annals of Allergy* (Nov.-Dec. 1947).

Of 60 patients treated with the drug known as compound No. 887, approximately 80%, with a moderately severe form of the disease, "benefited from the use of the drug," according to Dr. Hartman.

It was not possible to get complete relief of asthma attacks in all of these patients because the drug produced a feeling of "dopiness" in the patients when given in too large doses. The ideal dose, declared Dr. Hartman, is from 0.1 gram to 0.2 gram every four hours.

The sedative effect of the drug somewhat limits its usefulness during the day but makes it good to take before going to bed. Its sedative effect and its ability to check wheezing, shortness of breath and coughing enables the patient to get a good night's sleep.

The chemical name for this drug is beta-diethylaminoethyl 9,10-dihydroanthracene-9-carboxylate hydrochloride.

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CHEMISTRY—ORDNANCE

Poison Gas Rockets Predicted for Next War

➤ POISON gas, rather than atom bombs, may be in the long-range rockets that will descend on American cities if that much-discussed next war materializes, Col. Ludlow King, president of the Chemical Corps Association, suggests in the *Chemical Corps Journal* (Jan.).

Poison gases, he declares, "are from a very objective and realistic point of view, perhaps the most inexpensive casualty producer presently known. The cost of the two atomic bombs dropped on Japan could procure sufficient toxic gas to bring complete devastation to the populace of a thousand cities the size of Hiroshima."

The Nazis did not use poison gases during World War II because they are obsolete, as many persons now think, but because they knew that we were prepared to retaliate in kind, many times

over, Col. King declares. But for this deterring consideration, the Germans could have mined with gas the inundated areas over which our troops had to pass in the Normandy landings, and spread a thin film of liquid gas over the water, multiplying our casualties a thousand-fold.

In the same issue, an unsigned article states that the Japanese were well armed with poison gases during the war, but that they deliberately deprived their troops of chances to use them because of fear of American reprisals.

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ENGINEERING

New Slope-Design Features Lessen Danger of Slides

➤ MODERN engineering, based on laboratory studies, greatly lessens danger from slides of the earth banks of shipping canals, the American Society of Civil Engineers was told at its meeting in New York. The discussion centered around present proposals to replace the Panama canal with a sea-level structure.

Special slope-design treatment can produce slopes which not only would be stable under static loading, but which would resist dynamic forces so effectively that large explosions would not be expected to close even the deep sea-level Panama canal if constructed.

Apparatus developed and tests performed to investigate the strength of soils and soft rocks under dynamic loads were described by Dr. Arthur Casagrande and W. L. Shannon, of Harvard University, who have recently conducted tests of strength of soils under contract with the special engineering committee of the Panama canal.

The proposed sea-level canal would be virtually indestructible, even by atomic bombing, Col. James H. Stratton, supervising engineer of the Panama canal special engineering division, told the group. It would cost close to \$2,500,000,000, and would take ten years to construct. But it would serve future needs of inter-oceanic commerce and national defense for many years to come.

"A sea-level canal at Panama constructed by the conversion of the existing lock canal could not be destroyed by the enemy," he declared. "Only the atomic bomb could cause significant interruption in service, and then for not more than a few weeks. Navigation would be practicable in the sea-level canal even though tidal currents were not regulated."

Science News Letter, January 31, 1948

MEDICINE

New Lead to Prevention of Diabetes Seen by Nobelist

➤ A NEW lead to the possible prevention of diabetes may come from recent rat experiments, Dr. Bernardo Houssay of Buenos Aires, co-winner of a 1947 Nobel Prize, declared in a lecture at the University of California.

When the pancreas, gland which produces insulin, is removed, two or three months elapse before diabetes develops in the rats, Dr. Houssay reported. During this time the animal's blood sugar is normal.

The two to three month period is equal to several years in the human life span. And there is a possibility, Dr. Houssay thinks, that the same pre-diabetic period without symptoms exists in man.

"If it does occur," he said, "it gives a great advantage for diagnosing the condition and so preventing the progress of the disease by maintaining or increasing the functional capacity of the degenerating pancreas. Studies in this direction might be of extraordinary importance in the prevention of diabetes."

Science News Letter, January 31, 1948

AGRICULTURE

Plant Disease Forecasting New Government Service

➤ FORECASTING the spread of plant diseases, so that farmers may prepare for preventive spraying, is the newest service to be undertaken by the U. S. Department of Agriculture. An experimental program will be carried out this year at three regional centers, whose data will be forwarded to the Department's laboratories at Beltsville, Md., for coordination.

The regional reporting centers will be at Ames, Iowa, serving a great triangle of states from the Dakotas to Michigan to Missouri; at Newark, Del., serving states from Ohio to Maryland to New England; and at Raleigh, N. C., covering the 13 states of the South, from Kentucky to the Gulf and from Texas to Virginia.

Observations this season will be made on late blight of potatoes and tomatoes, blue mold of tobacco, and downy mildew of cucumbers, squashes, pumpkins and melons. Relations between occurrence and spread of these diseases and weather and other environmental factors will be studied.

Science News Letter, January 31, 1948

ASTRONOMY

Planets Illuminate Sky

Venus, Mars and Saturn will add to the brilliance of February evenings. Mercury will be seen at dusk and Jupiter will ascend a couple of hours before sunrise.

By JAMES STOKLEY

► BY the time February evenings are with us, the skies shine with their full winter splendor, but this year the addition of three bright planets—Venus, Mars and Saturn—makes them even more brilliant. The brightest is Venus, which sets a little too early to be shown on the accompanying maps. These show the appearance of the heavens about 10:00 o'clock on the evening of Feb. 1, and an hour earlier at the middle of the month. However, an hour before these times, Venus is easily located in the west, in the constellation of Pisces, the fishes, just below Aries, the ram, which is shown. Considerably brighter than any other star or planet, one need have no doubt of its identity.

The other two planets are to the east, both in Leo, the lion. Mars is alongside of Regulus, though considerably brighter. The magnitude of Mars is at a maximum this month (minus 1 on the astronomer's scale). Among the stars only Sirius, the dog-star, exceeds it in brightness, by about one and three-quarter times. Saturn, a little to the right of Mars, is of magnitude 0.2, which makes it about a third as bright as Mars.

Glimpse of Mercury

In addition, Mercury will be glimpsed early in the month. On Feb. 4 it is farthest east of the sun and for a few days around then it will be seen low in the southwest as the sky darkens. It will be lower than Venus. The last of the five naked-eye planets—Jupiter—is in the constellation of Sagittarius, the archer, and rises in the southeast a couple of hours before sunrise.

Among the stars (which, unlike the planets, are distant suns, shining with their own light) Sirius is the brightest, as noted above. This is low in the south, in Canis Major, the great dog. Above and to the right of this figure one sees Orion, the warrior. In this are two first magnitude stars: Betelgeuse, above, and Rigel, below. Between these are three fainter stars which form an easily recognized row that marks Orion's belt. Still higher,

and farther west, we come to Taurus, the bull, with red Aldebaran to mark his eye. In the bull's shoulder, farther to the right, are the Pleiades, a famous loose cluster of faint stars.

Directly overhead, at the time of the maps, is Auriga, the charioteer, with first magnitude Capella. Next to this group, in the direction toward Leo, are the twins, Gemini. Pollux is of the first magnitude while the other twin, Castor, is a little fainter. Below Gemini is Canis Minor, the lesser dog, in which Procyon shines.

Big Dipper in Northeast

In the northern sky the big dipper, part of the great bear, Ursa Major, hangs in the northeast, with the dipper's handle downwards. The two stars at the top are the pointers, showing the direction of Polaris, the pole star, in Ursa Minor, directly north. On the other side of the pole star is Cassiopeia, the queen, a group of stars like a letter W on one side.

Since the earth and the other planets revolve around the sun in approximately the same plane, we sometimes see these others in the same direction as the sun. Venus and Mercury, which move in orbits smaller than that of the earth, can never get to a position where they appear opposite in the sky to the sun. But the outermost planets—Mars, Jupiter and Saturn—can do so. The technical term for this is opposition, and it happens

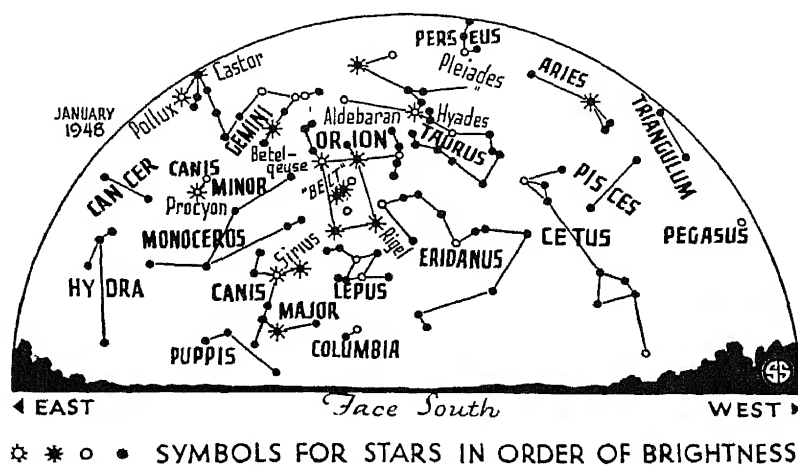
that both Mars and Saturn are in that position this month, the former on Feb. 17 and the latter on the 8th.

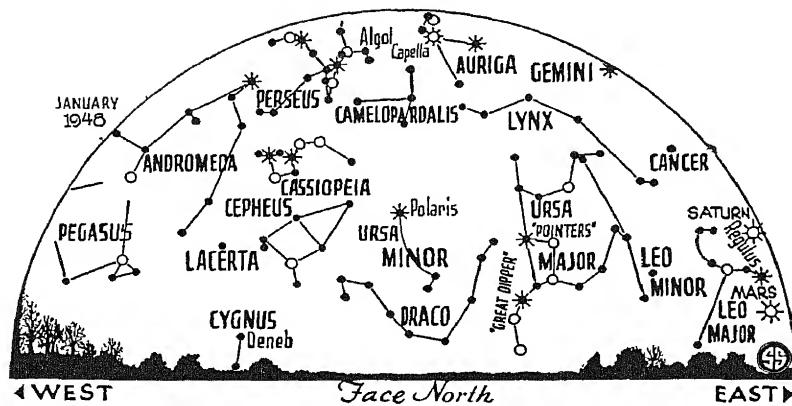
At opposition these planets are nearest, for they are only as far from us as the difference between their distance from the sun and that of the earth. When they are in the sun's direction (called conjunction) they are at a distance from us equal to the sum of these figures. When Saturn is at opposition on Feb. 8, at 9:00 p.m., it is 761,610,000 miles away, quite far, but it must be remembered that Saturn is the farthest of the naked-eye planets.

The orbit of Saturn is nearly circular, but that of Mars is more eccentric, i.e., more stretched out into an ellipse. Its mean distance from the sun is 141,690,000 miles, but once in the 687 of our days which it takes to go around its orbit, it comes as close to the sun as 128,690,000 miles, and at another time it is 26,000,000 miles farther, or 154,690,000 miles. The earth's orbit is much more circular than this, so at some oppositions Mars is considerably closer than at others. On March 5, Mars will be at aphelion (farthest from the sun). Opposition occurs only a couple of weeks before, so the two planets will be 63,020,000 miles apart, even when closest together.

The Red Planet Mars

In striking contrast was the opposition of Aug. 22, 1924, when Mars was nearly at perihelion (closest to the sun), and it was only 35,000,000 miles from us, only about 400,000 miles more than the very minimum possible. Not for centuries will we again be as close, but on Sept





11, 1956, Mars will be only 35,400,000 miles away. By that time powerful new telescopes, such as the 200-inch at Mt. Palomar, which will start operation this year, and the 120-inch of the Lick Observatory, now planned, will be in operation. New electronic observing techniques, now under development, may well by then have been perfected, further augmenting our telescopic powers, and the solutions to many problems concerning this red planet may finally be given.

One of the chief of these concerns the so-called "canals," curious straight markings on its surface which some expert observers with the largest telescopes never could see, while others have reported seeing them plainly with smaller instruments. They are best observed with the eye at the telescope. Some photographs seem to show them, but not clearly, for they are just at the limit of what can be recorded in this way.

The trouble is that the air through which we have to point our telescopes is continually in motion, and this bends the light rays and blurs the image. Occasionally, perhaps only for a fraction of a second, conditions may become very steady and the visual observer can get a glimpse of very fine detail. Since, in the past, photographic exposures have been at least several seconds, they were always

somewhat blurred. The tremendous light-gathering power of the 200-inch telescope may make it possible to take very short exposures which will catch the instants of "good seeing." This will involve taking hundreds or even thousands of pictures, one after the other, and then studying them to see which is the best. No doubt such a program will be carried out in 1956 at Mt. Palomar, and also, perhaps, about June 25, 1954, when Mars will be a little more than 40,000,000 miles away.

Time Table for February

Feb.	EST	
1	7:31 p. m.	Moon in last quarter
4	11:00 a. m.	Mercury farthest east of sun, visible for a few days in west in early evening
5	1:08 a. m.	Moon passes Jupiter
8	9:00 p. m.	Saturn opposite sun and nearest earth, distance 761,-610,000 miles
9	10:02 p. m.	New moon
	1:00 a. m.	Moon farthest, distance 252,-670 miles
11	1:07 a. m.	Moon passes Mercury
13	7:03 a. m.	Moon passes Venus
17	11:00 a. m.	Mars opposite sun and nearest earth, distance 63,020,000 miles
	8:55 p. m.	Moon in first quarter
19	10:00 p. m.	Mercury between earth and sun
23	7:45 a. m.	Moon passes Saturn
	7:00 p. m.	Moon nearest, distance 222,-130 miles
	8:51 p. m.	Moon passes Mars
24	10:10 p. m.	Full moon

Subtract one hour for CST, two hours for MST, and three for PST.

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in England, owned by the Duke of Bedford, is not quite purebred—there is a little more than three percent of domestic cattle blood in the strain.

The wisent is a taller, longer-bodied animal than its American cousin, states Mr. Glover. It is higher in the hind-quarters and not so thick in the body. He regards the wisent as much superior to the American bison.

Wisent are naturally forest animals, requiring food elements obtained by browsing on twigs and bark of shrubs and trees for best health. They do, however, eat some grass.

Before World War I there was a large herd in the Caucasus region, comprising well over a thousand head. There was a smaller herd, of possibly 200 animals, in a forest preserve in Poland. Besides these, there were smaller groups elsewhere in Europe, principally in zoos. During the period of confusion and want after 1918, all the animals in the Caucasus herd were killed for food by the natives of the region. The herd in Poland survived, but World War II resulted in the disappearance of most of its specimens. Now the rehabilitation of the species must be attempted with the 97 known pure-blooded animals.

In prehistoric times the wisent was abundant and widely distributed over Europe and parts of Asia. Its pictures were accurately drawn by Cro-Magnon artists in the caves of France and Spain. It figures in very early Mesopotamian art, and was probably the prototype of the great winged bulls of Assyria, long after it had disappeared from that part of the world.

During the Middle Ages and early modern times, hunting and the spread of cultivation steadily diminished its numbers and drove the survivors eastward. Then the staggering blows of two world wars have all but finished it off.

Science News Letter, January 31, 1948

WILDLIFE

Bison Near Extinction

► THE European bison, or wisent, close cousin to the North American bison, has been pushed to the edge of extinction by two world wars, reports Richard Glover of the University of Manitoba. Most recent available figures show a total of exactly 97 pure-bred specimens, 48 of them males and 49 females. Fifty of the animals are in Poland and the USSR; the rest are divided among Germany, the Nether-

lands, Sweden and Switzerland. If there is to be a comeback of the species, it is from these animals that the new stock must be bred.

Since the wisent crosses readily with both American bison and domestic cattle, there are a good many hybrids in various European countries. These, however, will be rigidly excluded from the comeback effort. Unfortunately, a well-tended herd

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Do You Know?

Chlordane is a fast-acting insecticide for Japanese beetle grubs.

America will need more *vegetables* this year to make up for a smaller supply of other foods.

Fire loss in the United States during the past year was greater than in any previous year.

Two *tree* varieties in Florida, that grow wild nowhere else in the world, are Florida yew and *Torreya* or *savin*.

Sheep, unless otherwise well-fed, will severely damage longleaf pine seedlings up to four feet in height if pastured among them.

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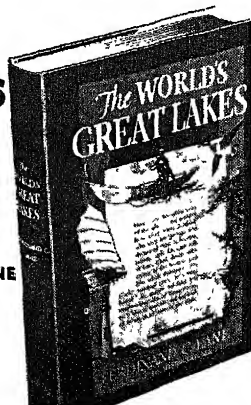
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MEDICINE

Check Bleeding Agent

➤ A **CHEMICAL** extracted from logwood trees and another which is a blood constituent might prove helpful in treating atomic radiation sickness and certain blood disorders, it appears from studies reported by Drs. E. J. Mackowiak and R. D. Barnard in the *Journal of the American Pharmaceutical Association* (Dec., 1947).

The studies were reported from the Veterans Administration Hospital, Batavia, N. Y., and the Terrace Heights Hospital, Hollis, Long Island.

The chemicals were studied in a search for substances to counteract the effects of heparin. Heparin is an anti-blood clotting agent used in treating some disorders, but too much heparin may result in uncontrollable bleeding. Increased production of heparin in the body has recently been considered a cause of the bleeding tendency in certain blood dis-

orders and also in radiation injury, such as that following atomic bomb explosions.

A dye, toluidine blue, had previously been reported by other investigators to be an effective anti-heparin agent, and the pharmacologists confirmed this.

The blood constituent, modified human globin, which they studied was good too, but was slow in its action, taking about 12 hours. This might be offset, the scientists pointed out, by its relatively low toxicity and future ready availability through the national blood program established by the American Red Cross.

The logwood tree extract, hematoxylin, is as effective as the dye for concentrations of heparin up to 2%. For higher concentrations of heparin, the action of hematoxylin becomes complicated by a marked precipitation of plasma proteins.

Science News Letter, January 31, 1948

MEDICINE

Rh Danger in Transfusions

➤ A **WARNING** of Rh danger in blood transfusions to women and even to very little girls who some day may be mothers is given by Drs. L. M. Hellman and G. J. Vosburgh of the Johns Hopkins Medical School and Hospital in the *Journal of the American Medical Association* (Jan. 10).

The danger is that Rh negative women and little girls may be sensitized through transfusions with Rh positive blood. Then, if they marry Rh positive men, their babies will be born with the severest form of erythroblastosis and usually will not survive.

Rh negative women who have babies by Rh positive fathers become sensitized by the Rh positive blood of their own babies. But this sensitization proceeds rather slowly and the first and often the second child born under such circumstances will be spared.

Transfusion with Rh positive blood is much more powerful in sensitizing the Rh negative woman than repeated bearing of Rh positive children, the Hopkins doctors declare. Even a small amount of blood at an early age may be dangerous. As an example of this they cite the case of a 22-year-old woman whose first baby was jaundiced five hours after birth because of anti-Rh positive substances in

his mother's blood. The anti-Rh substances developed as a result of transfusion of about five ounces of blood when the young mother was herself a two-months-old baby with dysentery.

The danger can be averted, the doctors point out, by testing for Rh factor every time a woman of childbearing age or a female child is given a blood transfusion. In their opinion, a "high degree of negligence may be charged" if such tests are not made. In cases of dire emergency when there is not time to test the patient's blood, only Rh negative blood should be given.

Cases of erythroblastosis have been increasing in recent years and blood transfusions have also become more frequent in the same period. At Johns Hopkins Hospital 1,100 transfusions were given in 1939 compared with 5,585 in 1946. This is a five-fold increase. In 1937 there was one case of erythroblastosis for every 1,732 childbirths, while in 1946 the ratio had risen to one case in every 348 childbirths. Since the percentage of Rh negativeness in the population is fixed, the increase must be due to an increase in the number of women sensitized to Rh positive blood. The increase in transfusions, the doctors believe, accounts for this.

Science News Letter, January 31, 1948

AERONAUTICS

Suction Slots for Wings

This new type of wing for airplanes was proposed to draw away a part of the boundary layer of air. It is still in the experimental stage.

➤ A PROPOSED new type of wing for airplanes with a slot through which part of the boundary layer of air is drawn away was described in the annual Wright Brothers Lecture by Dr. Sydney Goldstein of the University of Manchester, England, who is also the chairman of the British Aeronautical Research Council. The lecture was under the sponsorship of the American Institute of the Aeronautical Sciences.

The wing is designated as a suction airfoil. It is in an experimental stage but is promising. Pulling away part of the air in the so-called boundary layer next to the surface of the wing is a method to control the flow of this layer and delay the drag and other harmful effects when the smooth or laminar flow breaks into a turbulent flow. This breaking means a boundary layer separation from the surface of the wing; it is desirable to prevent the separation until the flow of air reaches the trailing edge of the wing.

"The story I am about to tell in this lecture is still incomplete," Dr. Goldstein said. "It is largely the story of researches carried out in Great Britain arising from an idea due to Dr. A. A. Griffith. The idea is at once very general and very simple." When a fluid flows along an immersed solid surface at sufficient speed, a boundary layer is formed. If the flow of the boundary layer can not be controlled, harmful results may follow. Removing part of the boundary layer by suction is an attempt to avoid these harmful effects.

To use the suction principle, the wing must be especially designed. How much of the boundary layer air needs to be removed is as yet undetermined. When the method of design was satisfactory, the English scientist stated, the separation was avoided by sucking away less than half. The suction may be effected by use of a ducted fan, or the air may be taken through wing slots to the intake of the turbo-jet engine. The amount of air removed in the latter case would depend upon the amount needed by the engine.

"In assessing the probable performance of a suction wing, the state of the bound-

ary layer (turbulent or laminar) at the slot through which part of it is sucked away is of great importance," he explained.

"In considering the principles of the design of low-drag aerofoils, we saw that we should like the velocity outside the boundary layer to rise to a position as far back along the wing as possible; but that we are hindered by the danger of turbulent separation if the rate of velocity decrease at the back of the aerofoil is too great. The danger increases, roughly, when the thickness of the aerofoil increases and when the position of maximum suction is moved further back."

"If, however, the whole of the pressure recovery, or velocity decrease, is concentrated over a very narrow interval along the chord, over which the boundary layer, or as much of it as necessary, is sucked away to stop separation, all danger of separation is avoided, and we can have a favorable velocity gradient over the whole of the rest of the chord."

"In spite of the work which has been done, it is clear that much is yet unknown about suction wings," he declared. The greatest gains will be obtained by application to the flying wing type of aircraft, and "it becomes feasible to design a much smaller flying wing than otherwise would be the case."

Science News Letter, January 31, 1948

PHYSICS

Popular Radio Program Features Dots, Dashes

➤ A RADIO program that consists essentially of ticks, dots, dashes and a musical note is faithfully followed by tens of thousands of enthusiastic listeners.

Jewelers and navigators, school teachers and musicians, radio hams and power companies all get vital information from these coded broadcasts, issued continuously night and day.

You can get the correct time by listening to these signals. Time announcements are given at five-minute intervals in International Morse Code. These signals are being advanced one minute so that in the future the audio frequencies

will be interrupted for a minute precisely on the 59th minute, on four minutes past the hour, nine minutes past and so on.

A faint tick heard at intervals of precisely one second over station WWV of the National Bureau of Standards provides a useful standard time interval.

Musicians use the broadcast to tune their instruments. The standard of musical pitch, A above middle C, is broadcast for four minutes and interrupted for one minute.

The National Bureau of Standards' station provides six important technical broadcast services to the nation and five to the world. They are: 1. standard radio frequencies, 2. time announcements, 3. standard time intervals, 4. standard audio frequencies, 5. standard musical pitch, and 6. radio propagation disturbance warning notices. The bureau's broadcast offers the only such service being provided by any country.

Station WWV can be heard on the following frequencies: 2.5, 5, 10, 15, 20, 25, 30 and 35 megacycles.

Science News Letter, January 31, 1948

CHEMISTRY

Test Developed To Detect Minute Traces of Arsenic

➤ HERE'S one for the whodunit fans: University of Pennsylvania chemists have developed a simple, quick test for "microscopic traces" of arsenic in foods. As little as one thirty-thousandth of a pound of the poisonous metal can be detected, even in the presence of lead, tin and some other metals that interfere with conventional tests.

The test was reported by James H. Freeman and Prof. Wallace M. McNabb at the meeting of the American Chemical Society in Philadelphia.

It is said also to have industrial applications, since a fraction of one percent of arsenic impurity, for example, seriously impairs the electrical conductivity of copper wire, and traces of arsenic can poison and destroy the effectiveness of platinum catalysts used to stimulate many vital chemical reactions.

The test can be completed within 45 to 50 minutes. It involves acidifying the suspected material, heating it with sodium hypophosphite, dissolving in a solution of potassium bromide and bromate, and finally adding potassium iodide. The amount of iodine freed by this procedure gives an accurate indication of the arsenic content of the sample.

Science News Letter, January 31, 1948



Ice, the Soil-Maker

➤ SOILS of the earth's cooler lands were made to a major extent by the action of ice on rock. And since all food comes ultimately from the soil, it is fair to say that winter ice helped to make our bread.

Ice acts in many ways to break rock into stones, and then to grind the stones into the silts and sands that are the mineral basis of the soil. Of the entire complex story, we can select only one or two phases for brief examination.

We have of course all heard the story of the great Ice Age many times: how the outcreeping edges of the continental ice sheets acted as a gigantic combination rock mill, bulldozer and plow, to grind boulders to gravel and crunch gravel to fine soil; then how the vast outpourings of water caused by the melting of the ice carried, sorted and laid down the various types of soil where we find them today. It is a very dramatic story, and it happened long ago.

Less dramatic, but still in process wherever winter gets really cold, is the rock-breaking action of ice that takes place whenever water freezes, and again when ice thaws. It is slow, but it goes on year after year, until even the most stubborn of stones at last yields bread.

The power of ice to rend rock depends on its unique property of expanding, slightly but powerfully, just below freezing-point. Thus a thin film of water in a chance fissure in granite, or between layers of sandstone or shale, becomes a spreading wedge of irresistible force when it solidifies, and again as it warms up from sub-zero temperatures towards the thawing-point.

In regions where there are alternations of thawing and freezing at the beginning

and end of winter, or even throughout the cold season, each decisive rise or fall in temperature means myriad silent rock-breaking pressures. Sometimes, indeed, they are not so silent, and you can hear an old rock split with a report like a cannon. But most of the work is done without thus proclaiming itself; incredibly slow but inevitably sure.

The greater part of this ice-weathering of rock occurs under thicker or thinner mantles of soil already formed by the

METEOROLOGY

Hard To Control Weather

➤ DON'T expect scientists to control the weather when they are not able to harness the raging flood waters of the Mississippi River, a U. S. Weather Bureau meteorologist cautioned.

Dr. Harry Wexler, chief of the Weather Bureau's Special Scientific Services Division, explained that typical air currents from the poles or tropics which give us cold or hot weather are 4,500 times as large as the flow of the Mississippi under flood conditions.

"Since man cannot control the relatively sluggish, shallow Mississippi River during floods, even with the aid of natural and man-made river banks, it is not likely that man can control on a global scale the fast and deep rivers of the atmosphere which determine our weather," the scientist argued.

Dr. Wexler discussed weather control as a guest of Watson Davis, director of Science Service, on Adventures in Science, heard over the Columbia network.

"A typical current of polar or tropical air is 1,000 miles wide, 10 miles high, moving at an average speed of say 20 miles an hour.

"This means that 1,000,000,000,000 (one trillion) tons of air per hour is sweeping over certain places," Dr. Wexler said.

By contrast, he pointed out, the Mississippi's top flow during floods is only 225,000,000 tons per hour.

This gloomy picture of weather control on a global scale does not prevent doing something about the weather in a small, local area, however, the meteorologist said. Although rainmaking with dry-ice and other materials dropped on clouds from planes is a recent development, local weather control of different types has been successfully achieved in other ways for many years. One method is the burning of fuel to protect orchards,

same process; it is difficult to tell where bedrock ends and soil begins. But much rock-splitting also takes place on mountain slopes, and here the fragments sooner or later slide and roll into the stream-courses at the base, there to be tumbled and hammered against each other until the big boulders are ground into gravel and their silt-fine fragments are carried far downstream, to be built into sandbars or left on the flood-plains after spring freshets.

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Rainmaking is still in its early stages, Dr. Wexler cautioned. One of the big questions is how much rain can be produced by dry-ice bombardment of clouds. This may be answered by experiments now under way at the Clinton County Air Base in Ohio. The Weather Bureau is cooperating with the Air Force, Navy and the National Advisory Committee for Aeronautics in experiments to measure actual rain from clouds which have been showered with dry-ice and other materials.

Radar will be used to check up on when a cloud is changed from a non-precipitating to a precipitating one and the position of the plane dispensing the seeding agent.

Even local rainmaking may not solve the drought problem, a major threat to food production in a hungry world.

"Rain simply cannot be made in a current of air either too dry or too stable to produce clouds," the scientist explained.

Science News Letter, January 31, 1948

YOUR HAIR AND ITS CARE

By O.L. Levin, M.D. and H.T. Behrman, M.D.

Two medical specialists tell you what to do to save and beautify your hair, stimulate healthier hair growth, and deal with many problems, as: Dandruff—gray hair—thinning hair—care of the scalp—baldness—abnormal types of hair—excessive oiliness—brittle dryness—hair falling out—infection—parasites—hair hygiene, etc., etc. "A worthwhile book full of important information."

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ANGLER'S CHOICE. An Anthology of American Trout Fishing—Howard T. Walden II, ed.—*Macmillan*, 326 p., \$3.75. A collection of stories and articles to delight the fisherman.

BIBLIOGRAPHY OF OHIO ARCHAEOLOGY—Richard G. Morgan and James H. Rodabaugh—*Ohio State Archaeological and Historical Society*, 189 p., paper, \$2.50.

A CATALOGUE OF INSECTICIDES AND FUNGICIDES. Vol. 1, **CHEMICAL INSECTICIDES**—Donald E. H. Frear—*Chronica Botanica, Annales Cryptogamici et Phytopathologici*, Vol. VII, 203 p., paper, \$6.50.

CHEMICAL ENGINEERING FUNDAMENTALS—Chalmer G. Kirkbride—*McGraw-Hill*, 419 p., illus., \$5.00. A text for an introductory course.

CHEMISTRY EXPERIMENTS AND EXERCISES—Andrew J. Burdick and Joseph J. Duleston—*Singer*, rev. ed., illus., paper, \$1.04. A laboratory book with detachable pages intended for use with any text.

THE COWRIE SHELL MIAO OF KWEICHOW—Margaret Portia Mickey—*Peabody Museum, Papers*, Vol. 32, No. 1, 83 p., illus., paper, \$2.50. The story of the daily life of a non-Chinese people living in a village in China.

THE DEFENSE OF WAKE—R. D. Heinl, Jr.—*Govt. Printing*, 75 p., illus., \$1.25. Official account, factual but thrilling, of the Marines' defense of Wake, seagirt Alamo of the naval war in the Pacific.

ELECTRONICS FOR INDUSTRY—W. I. Bendz with assistance of C. A. Scarlott—*Wiley*, 501 p., illus., \$5.00. A text for engineering students, it also includes much valuable reference material useful in practice.

FLORA HAWAIIENSIS: The New Illustrated Flora of the Hawaiian Islands—Otto Degener—*New York Botanical Garden*, 2d ed., looseleaf, illus., \$3.50. Books 1 to 4 brought together in one volume.

THE FUNGI OF MANITOBA AND SASKATCHEWAN—G. R. Bisby and others—*National Research Council of Canada*, 189 p., illus., \$3.50. Scientific information about some 2,761 species.

FURTHER STUDIES IN THE GENUS DODONAEA—Earl Edward Sherff—*Field Museum of Nat. History, Botanical Series*, Vol. 23, No. 6, 48 p., paper, 75 cents.

GRIERSON ON DOCUMENTARY—Forsyth Hardy, ed., with American notes by Richard Griffith and Mary Losey—*Harcourt, Brace*, 324 p., \$3.75. Selections from the writings of a British film critic having to do with "documentary films" which term he is credited with originating.

HIGHER EDUCATION FOR AMERICAN DEMOCRACY: Vol. III, Organizing Higher Education—A Report of the President's

Commission on Higher Education—*Govt. Printing*, 74 p., paper, 30 cents.

HOMES—Editors of Progressive Architecture—*Reinhold*, 190 p., illus., \$5.00. A book for home builders and dreamers containing a wealth of photographs and plans.

HUMAN ANCESTRY: From a Genetical Point of View—R. Ruggles Gates—*Harvard University Press*, 422 p., illus., \$7.50. An account of the development of the modern races of man from Pithecanthropus to date.

INFORMATION PLEASE ALMANAC 1948—John Kieran—*Doubleday*, 960 p., \$2.00. A useful and up-to-the-minute book of facts. The science section is very small, limited to only eleven pages.

MICROMERITICS: The Technology of Fine Particles—J. M. DallaValle—*Pitman*, 2d ed., 555 p., illus., \$8.50. Revised and greatly enlarged edition of a text devoted to the behavior of small particles including the submicroscopic.

NASKAPI LAW—Julius E. Lips—*American Philosophical Society, Transactions, New Series*, Vol. 37, Part 4, 111 p., \$1.75. Law and order in a hunting society—the Lake St. John and Lake Mistassini bands. Of interest to anthropologists and legal historians.

NORTH AMERICAN SPECIES OF MYCENA—Alexander H. Smith—*University of Michigan Press, Scientific Series*, Vol. XVII, 521 p., illus., \$6.00. A taxonomic revision of one of the larger genera of the gill fungi.

ORGANIC SYNTHESIS: An Annual Publication of Satisfactory Methods for the Preparation of Organic Chemicals, Vol. 27—R. L. Shriner, ed.—*Wiley*, 121 p., \$2.25. The work of a large number of contributors.

ORGANIZING SCIENTIFIC RESEARCH FOR WAR: The Administrative History of the Office of Scientific Research and Development—Irvin Stewart—*Little, Brown*, 358 p., \$5.00. This volume of the series *Science in World War II* is an official account of the tremendous job of organization.

PLANNING YOUR FAMILY—Herbert Yahraes—*Public Affairs Committee*, Pamphlet, No. 136, 32 p., illus., paper, 20 cents. Contains bibliography for further reading.

A PRELIMINARY STUDY OF HAWAIIAN SPECIES OF THE GENUS RAUVOLFIA; ADDITIONS TO THE GENERA SCALEZIA AND HIDALGOA—Earl Edward Sherff—*Field Museum of Nat. History, Botanical Series*, Vol. 23, No. 7, 15 p., paper, 25 cents.

PRIVATE ENTERPRISE OR GOVERNMENT IN MEDICINE—Louis Hopewell Bauer—*Thomas*, 201 p., \$5.00. A controversial subject discussed by a member of the board of trustees of the American Medical Association and president of the Medical Society of the State of New York.

PROCEEDINGS OF THE SOCIETY FOR EXPERIMENTAL STRESS ANALYSIS, Vol. V, No. 1—C. Lipson and W. M. Murray, ed.—*Addison-Wesley Press*, 136 p., illus., \$6.00.

REPORTS OF OFFICERS FOR THE FISCAL YEAR ENDED SEPTEMBER 30, 1947—*Carnegie Corporation*, 81 p., paper, free from publisher: 522 Fifth Ave., New York, N. Y.

THE ROAD TO GOOD NUTRITION—Lydia J. Roberts—*Govt. Printing Office*, Children's Bureau Pub. No. 270, rev. ed., 51 p., 15 cents.

ROAD TO THE SEA. The Story of James B. Eads and the Mississippi River—Florence Dorsey—*Rinehart*, 340 p., illus., \$4.00.

The biography of the engineer who built the bridge bearing his name in St. Louis.

THE SIERRA NEVADA: The Range of Light—Roderick Peattie, ed.—*Vanguard*, 398 p., illus., \$4.50. A beautifully illustrated book of material on one of the country's most attractive beauty spots written by a group of specialists.

SPI HANDBOOK—*Society of the Plastics Industry*, 451 p., illus., \$7.50. A wealth of reference material for those making or using plastics.

THE TENNESSEE, Volume II: The New River, Civil War to TVA—Donald Davidson—*Rinehart*, 377 p., illus., \$3.50. A history of one of America's great rivers including the development of Muscle Shoals. One of a series.

THE UNITED NATIONS—Herbert Vere Evatt—*Harvard University Press*, 154 p., \$2.50. As viewed by Australia's Minister for External Affairs. The book is revised from the Oliver Wendell Holmes lectures given in 1947.

VEGETABLE GROWING—James Sheldon Shoemaker—*Wiley*, 506 p., illus., \$4.50. A text which will also be useful to the home and professional gardener.

WHOM THE GODS LOVE: The Story of Evariste Galois—Leopold Infeld—*Whitlsey*, 323 p., illus., \$3.50. The dramatic life story of an ardent lover of the republic in France who only after his death became known as a mathematician.

Science News Letter, January 31, 1948

AERONAUTICS

Rip-Stop Parachute Adds Safety to Plane Jumpers

➤ NEW fabric for parachutes, dubbed rip-stop material, adds safety in jumping from planes because of its strength and ability to stop tiny rips that sometimes occur in high-speed bail-outs before they spread to make the parachute useless.

Parachutes of the new fabric, which has been thoroughly tested in high jumps, will go into production this month and 5,000 will be made this year for use by the Department of the Navy. They will be made at the Naval Aircraft factory in Philadelphia.

The fabric is nylon. The rip-stop feature is heavy cross-threads at quarter-inch intervals. Tests show that this heavy thread will prevent a rupture in the fabric from extending into a long rip. The new fabric is light. With it 28-foot parachutes will weigh no more than the present 24-foot chutes, and can be packed in the same container. It also provides a slower rate of descent, about 20 feet per second as compared with 25 feet with ordinary parachutes.

Science News Letter, January 31, 1948

• New Machines and Gadgets •

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 399. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

⚙️ **ROLL-AWAY DOORS** for kitchen cabinets, made of light-weight, interlocking plastic strips, slide up and out of the way at a touch. They operate somewhat similar to the window shade, are finished in various colors, and are easily cleaned with soap and water.

Science News Letter, January 31, 1948

⚙️ **IMPROVED CAR WASHER** is a waterproof mitten on the back of a rubber-like sponge into which water is conducted by a connection to a garden hose. The water, flowing steadily through the spaces within the sponge, rinses and washes the surface at the same time.

Science News Letter, January 31, 1948

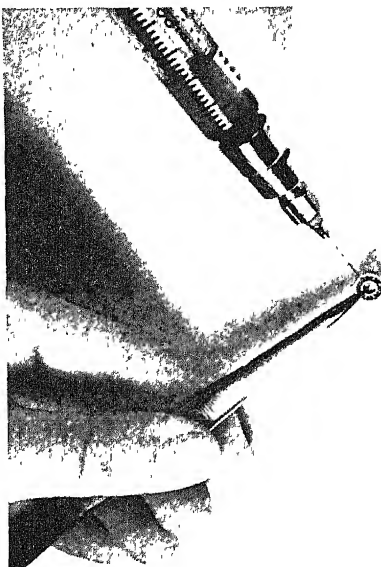
⚙️ **PLANETARIUM**, for use in home or school, projects on ceiling or wall constellations including most stars visible to the naked eye. It is a box with 12 faces, with a light in the center, punched with holes to represent the stars. It operates on house current and makes one revolution every four minutes.

Science News Letter, January 31, 1948

⚙️ **BRUSHING MACHINE**, developed especially for cleaning oil, grease and dirt from automobile clutch plates, is semi-automatic in operation and greatly speeds the process. The plates drop onto a rotating turntable which carries them under powered revolving brushes.

Science News Letter, January 31, 1948

⚙️ **BALL BEARINGS**, for use where freedom from magnetic influences are necessary, are made of hardened beryl-



lum-copper alloy, and are designed particularly for electrical, electronic, geophysical and other instruments. The smallest fully-ground non-magnetic ball bearing made is shown in the picture.

Science News Letter, January 31, 1948

⚙️ **ROPES OF BEADS** for neckwear are made of cellulose acetate plastics of many colors which are permanent because the coloring is in the plastic itself. The beads do not chip, and will not break even when dropped on a hard floor.

Science News Letter, January 31, 1948

⚙️ **"BLACKBOARDS"** for home and schools are actually white, green, yellow

or gray in color, being made of wood-fiber with a light-colored coating of vinylite plastic, sprayed on and baked. Special dark-colored dustless crayons are used with these boards.

Science News Letter, January 31, 1948

⚙️ **PLASTIC TOY**, shaped somewhat like a spool, rolls back to the child after being rolled away. It has inside its ornamental bulging center section a spring mechanism, wound up by the forward movement, which causes it to roll back.

Science News Letter, January 31, 1948

Science Service Radio

➤ Listen to "Adventures in Science" with Watson Davis over Columbia Broadcasting System at 3:15 p.m. EST every Saturday afternoon.

Feb. 7—The Story Behind the National Blood Program—Dr. Ross McIntire, American Red Cross

Feb. 14.—Scientists of Tomorrow—Winners of the Science Talent Search

Feb. 21—Sounds from the Sun—Mr. Grote Reber, National Bureau of Standards

Feb. 28—National Meeting of Science Clubs of America, Broadcast from the Science Talent Search

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Question Box

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AGRICULTURE

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CHEMISTRY

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GENERAL SCIENCE

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How can two hitherto fatal diseases be cured? p. 70.

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Why are there so few pure-bred European bison? p. 75.

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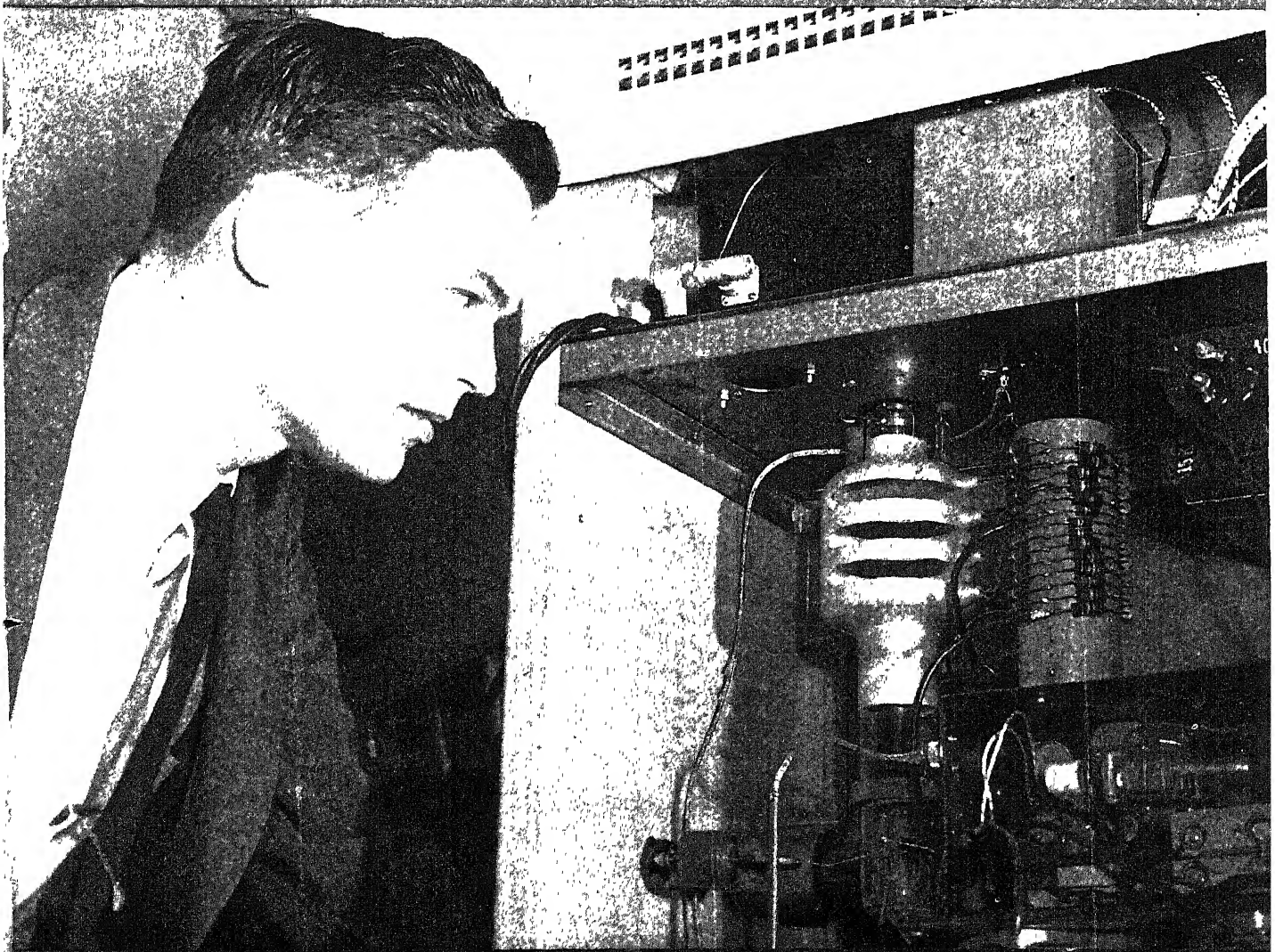
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SCIENCE NEWS LETTER



Vol. 23, No. 6

THE WEEKLY SUMMARY OF CURRENT SCIENCE • FEB. 7, 1948



Diamonds Amplify

See Page 82

A SCIENCE SERVICE PUBLICATION

ELECTRONICS

Amplify Electric Current

By having an electron gun shoot a beam at a small diamond chip it is possible to produce electric currents several hundred times as large as the original.

See Front Cover

➤ AN electric current shot at a diamond chip has been amplified, or strengthened, as much as 500 times by a new method developed in the Bell Telephone Laboratories, the American Physical Society was told in New York by Dr. K. G. McKay of that research center.

He described the discovery as a radically new method of controlling the flow and amplification of an electric current, one that may have far-reaching influence on the future of electronics. It is not expected to replace existing electronic techniques but rather to supplement them.

The method is based on the discovery that when beams of electrons are shot at an insulator, in this case a diamond chip, electric currents are produced in the insulator which may be several hundred times as large as the current in the original electron beam. The apparatus is shown being inspected by Dr. McKay on the cover of this week's SCIENCE NEWS LETTER.

The diamond chips used are what are called saw-cuts, obtained from a natural diamond in shaping it for a gem. They are roughly the size of a small snow-

flake. Before they are used for this electrical process, they are coated with very thin films of gold, applied by the evaporation method, to afford electrical connections.

Methods of amplifying currents in gas or vacuum tubes have been known for 35 years, Dr. McKay stated. But this has never been done previously in solids. The process is somewhat similar, he said, to the technique of translating the energy of light into electricity by the well-known photo-electric cell.

The experiments reported by him stemmed directly from previous Bell Laboratory research in which current was induced in diamonds by bombarding them with alpha particles. These are relatively heavy, positively charged bits of matter shot off by radioactive substances. The findings were verified in other laboratories, particularly at the National Bureau of Standards. The development promises a new and improved laboratory tool for detecting and counting alpha particles. The National Bureau of Standards has already announced that diamonds might be used to replace the Geiger counter, the standard instrument to detect radioactivity discharges.

Science News Letter, February 7, 1948

GENERAL SCIENCE

New Drive for Foundation

This bill, which may finally assure federal support for science, will soon be introduced to Congress. Plan measure to overcome President's former objections.

➤ A THIRD drive to give the U. S. a long-delayed National Science Foundation is quietly under way. The bill which may finally bring civilian control to federal support of science is expected to be introduced soon.

The new measure is being planned to overcome the objections raised by President Truman when he killed, via pocket veto last August, a National Science Foundation Bill passed by the first session of the 80th Congress. Sen. H. Alexander Smith, R., N. J., leader of the group supporting the vetoed bill, will in-

troduce the new version in the Senate, while Rep. Charles A. Wolverton, R., N. J., and chairman of the House Committee on Interstate and Foreign Commerce, may introduce the same bill simultaneously in the House.

One Science Foundation bill has already been referred to Rep. Wolverton's committee. This bill, which answers at least one of the President's veto objections, was introduced a few weeks ago by Rep. J. Percy Priest, D., Tenn., but it is not expected to get out of the committee.

The National Science Foundation is a bit of postwar business which has been accumulating an ironic history since the end of hostilities. Before the war ended, scientists and others recognized that federal support of science, which played a big role in victory, should be continued in peace. The wartime Office of Scientific Research and Development, it was generally agreed, would be succeeded by a National Science Foundation.

The first bill to establish the foundation passed the Senate in the 79th Congress, but did not get to the floor of the House. Last year's Science Foundation Act got to the White House before being killed. But everyone remains convinced that the foundation is necessary. No one has opposed it. The question has been and continues to be one of setting up an organization satisfactory to the President, Congress and scientists.

The Administration's budget for the coming fiscal year includes \$15,000,000 for the as-yet-unauthorized foundation.

"I hope that the Congress in this session will pass a bill for this purpose (National Science Foundation) in keeping with the principles of responsible and efficient administration," the Chief Executive declared in his budget message.

Support of scientists for the foundation is united in the Inter-Society Committee for a National Science Foundation, a unique organization representing scientific and educational organizations. Pres. Edmund E. Day of Cornell University is chairman of the group's executive committee. Vice-Chairman is Dr. Harlow Shapley, director of the Harvard College Observatory and past president of the American Association for the Advancement of Science, while Dr. Dael Wolfe of the American Psychological Association is secretary-treasurer and Washington representative.

The Inter-Society Committee is an impressive and unique lobby with the sole function of pressing for a National Science Foundation. They are hopeful that the fight for the foundation may be nearing an end.

If the new bill coming before Congress is brought to a vote, it is unlikely anyone will want to vote against science. And if this measure represents an improvement in the eyes of the Administration, it can become law.

Despite the Marshall Plan, inflation and taxes, the second session of the 80th Congress may be remembered in future years as the one which started the National Science Foundation.

Science News Letter, February 7, 1948

NUCLEAR PHYSICS

New Steps in Electricity

Germanium metal bombardment with a cyclotron has produced new types of electrical "semiconductors" which may be useful for radio, radar and microwave.

➤ BY knocking holes of positive electricity in the unusual metal germanium with an atom-smasher, Purdue University physicists have created a new kind of substance that promises to be useful in rectifying electricity and converting light into electrical effects.

Dr. K. Lark-Horovitz, head of Purdue's department of physics, told the American Physical Society meeting in New York that with the Purdue cyclotron new types of electrical "semiconductors" have been produced which promise to have varied applications in the field of radio, radar and microwave.

Very pure germanium metal was bombarded with the hearts of heavy hydrogen atoms, deuterons, accelerated to 10,000,000 volts. Although the attack was for only a few seconds, lasting changes were produced in the metal, and the resistance of the metal was increased ten-fold.

"Holes" which behave like electrons that are positive electricity instead of the usual sort of negative electricity are created by the bombardment and this leads to new phenomena which allow the use of the bombarded material as rectifiers, photosensitive devices, and for other possible uses.

The bombardment dislocates permanently atoms from their regular positions in the metal, Dr. Lark-Horovitz explained, and when these atoms are dislocated they are able to take up electrons from the internal structure of the metal and produce in this way some holes that for all practical purposes behave like positive electrons.

Half of a piece of the metal can be bombarded and made to conduct electricity by means of the positive holes and the other half can be left alone, conducting in the ordinary manner. This makes a rectifier that can yield direct current from alternating current. The sharp boundary between the positively and negatively conducting regions is extremely photosensitive and can be used to convert light into electricity, particularly in the invisible infrared regions of the spectrum.

Other nuclear particles are being tried in a similar way for their effects on

germanium and other substances. The hearts of helium atoms, called alpha particles, have already been found to produce strong effects, Dr. Lark-Horovitz reported. Drs. E. Bleuler, R. Davis, and D. Tendam were in the Purdue cyclotron group making the experiments.

Science News Letter, February 7, 1948

AERONAUTICS

Largest Ram-Jet Engine Ever Flown Passes Test

➤ THE largest ram-jet engine ever flown was successfully tested in Inyokern, Calif., the U. S. Navy revealed. Its speed was far in excess of the speed of sound. The "flying stovepipe" shot through the air like a rocket; it was not in a plane.

The ram-jet is not a primary source of power for an airplane, but a secondary power to give sudden spurts of speed to a plane already travelling at a fast clip. A speed of from some 300 to 400 miles an hour is required before the ram-jet scoops up enough air to cause combustion and set it into operation.

Something similar to the ram-jet is already in use in a few planes as an "after-burner" behind the jet engine to complete combustion of unconsumed combustibles in the jet exhaust.

The ram-jet engine was developed by the Applied Physics Laboratory of the Johns Hopkins University at Silver Spring, Md., during the war, and was designed especially as the propulsion unit for guided missiles which acquired initial speed by means of a rocket or a combination of rockets.

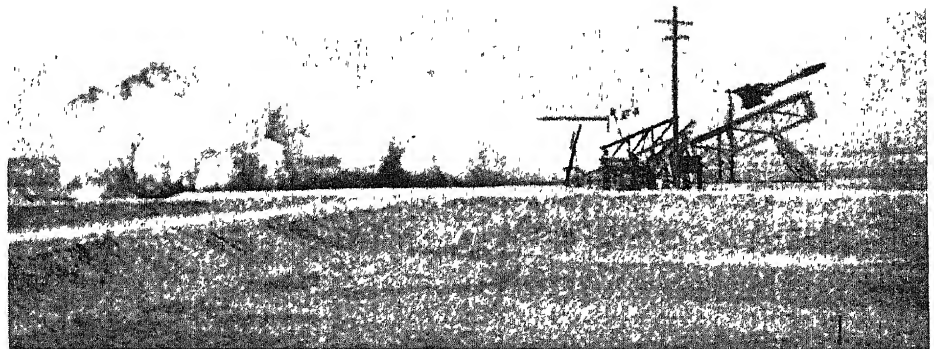
This type of engine has no moving parts. It is a metal tube open at both ends which scoops up air at high speed to cause the combustion of a fuel within, giving a high-speed discharge of gases at the rear, thus causing propulsion in the same manner as the ordinary jet engine. However, it is a powerful device. Pound for pound of engine weight, the large ram-jet just tested delivers about 25 times the power available from the best aircraft reciprocating engine.

Science News Letter, February 7, 1948

AERONAUTICS

Plane and Missile Bodies Must Be Slim and Pointed

➤ AIRCRAFT bodies, both of planes and missiles, must be slender with long pointed noses, and with all body angles as small as possible, if they are to be used at extremely high altitudes, the Institute



SUCCESSFUL FLIGHT TRIAL—This shows the largest supersonic ram-jet engine ever flown leaving the launching rack. The ram-jet must first be boosted to high speed by a rocket, which then drops off, leaving it to continue under its own power.

of the Aeronautical Sciences was told by Jackson R. Stalder and David Jukoff of the National Advisory Committee for Aeronautics. The reason is atmospheric friction.

At 75 miles altitude, they said, the heat of the sun has little effect as contrasted with its potency at customary flight levels. At altitudes of 150 miles, solar radiation is the predominating factor that determines the temperature of a body in flight. Within the earth's atmosphere friction alone melts meteorites that wander into it.

"At the extreme altitude encountered during flight of sounding rockets or missiles," they stated, "the atmosphere can no longer be considered as a continuous medium, and account must be taken of the motions of the molecules comprising the atmosphere." They submitted calculations of the temperatures of bodies travelling at altitudes from 75 to 150 miles, at speeds up to 13,000 miles per hour.

Wing Design for Speed

Power for supersonic flights has forced designers to consider relatively unconventional wings, most of them very thin, with a short span relative to their size, and a high degree of backward or forward sweep, the meeting was told by Victor I. Stevens, Jr., of the same government aviation laboratories.

The exhaustive study of wing shapes became urgent, he said, with the development of power plants capable of driving aircraft at supersonic speeds. Heretofore the primary limit on airplane speed was the available power. A wide range of wing designs were shown on charts, and their expected performance as determined by wind tunnel and other tests was indicated.

Science News Letter, February 7, 1948

VETERINARY MEDICINE

Vaccine Protects Poultry From Newcastle Disease

➤ A NEW vaccine to protect poultry against Newcastle disease, one of the most destructive of poultry maladies, has been developed by scientists at the Massachusetts Agricultural Experiment Station. It is prepared from a low-potency virus, and inoculated by the thrust of a small needle into the wing-web—the so-called "stick method."

Success with some 12,000 chicks is reported. Immunity was tested with a

potent virus from one to three months after vaccination, and all the young chickens survived.

It has been found possible to combine

TECHNOLOGY

New Type of Bed Proposed

➤ CONCRETE blocks will replace metal beds in hospitals of the future, if a French architect has his way. But the bed would feel no harder to the patient.

Jean Walter, a French hospital designer, explains his novel concrete bed in a report on hospital building in the journal, *Lancet*, (Jan. 3).

Patients would sleep on the usual mattress and springs. Instead of the metal frame support, the bed would be on a hollow concrete block covered with earthenware.

"This would save considerable trouble in cleaning," M. Walter points out.

Each block would have drawers for the patient's property and medical equipment, and the concrete bed could be wired for diagnostic instruments.

The new type of bed is only one of several suggestions the French architect has for modern hospitals. Hospitals, he believes, should be designed like industrial plants to prevent waste effort. And many hospitals use too much space.

The New York Hospital, built in 1930, has 576 cubic meters of space for each bed. M. Walter has designed hospitals with as little as 90 cubic meters per bed.

"I have discarded the dogma that all wards should face south," he declares.

Acute surgical patients average only 12 days in the hospital, while medical patients average 20. He argues that sunshine is not of great importance in this short time and that modern heating makes the sunlight unnecessary for warmth.

M. Walter's basic design for a large hospital consists of a central core, five to eight stories tall, with several wings extending out from the center. Through the central tower run elevators for patients, staff and visitors and other communication lines.

The wings on succeeding stories are graduated so that each floor has a balcony. This permits recuperating patients to get outside without using the elevator or leaving the building.

Top floor of the Frenchman's hospitals always is for the kitchen, so that the smell of cooking will not spread through the building.

And where is the architect's ideal

this vaccine with another, against fowl pox, and thus give the birds double protection with a single vaccination.

Science News Letter, February 7, 1948

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GENERAL SCIENCE

STS Honorable Mentions

Fifty-five girls and 205 boys will be recommended for scholarships as a result of their selection for honors in the Seventh Annual Science Talent Search.

➤ **HONORABLE** Mentions in the Seventh Annual Science Talent Search were announced by Watson Davis, director of Science Service. Of the 260 outstanding seniors in the list, 55 are girls and 205 are boys; the division was determined by the ratio of girls to boys who participated in the competition.

The 260 young people to whom Honorable Mention listing was given reside in 158 communities, located in 38 states and the District of Columbia. They were chosen from among 16,421 entrants, 3,161 of whom completed the science aptitude examination, submitted recommendations and scholarship records and wrote essays on "My Scientific Project."

Forty highest-ranking boys and girls have already been notified that they are winners of all-expense trips to Washington, where they will spend five days as participants in the Science Talent Institute, held in Washington Feb. 27 through March 2. At the closing session of the Institute, \$11,000 in Westinghouse Science Scholarships will be distributed, (*See SNL*, Jan 31).

All 300 selected for honors will be recommended as candidates for matriculation to scholarship-awarding colleges and universities.

In the six preceding Science Talent Searches, most of the students named in the Honorable Mention list have been offered scholarships, and many of those named this year will qualify for valuable scholarships and other financial aid in the colleges, universities and technical schools of their choice. The judges found all 300 winners to be students of outstanding ability.

Students in the Honorable Mentions list invariably rank high in their high school graduating classes: 37% of the boys and 33% of the girls stood first or second among their classmates. All have been interested in science for some years; 59% of the boys and 64% of the girls have studied some science in each of the four high-school years. A larger number have three years each of science: 90% of the boys and 98% of the girls.

The Honorable Mentions did not win their places merely by keeping their noses

in books; without exception they show records of participation in extracurricular activities. Science clubs have attracted many; 191 belong to such clubs, most of which are affiliated with the Science Clubs of America.

In Alabama one student received honorable mention; in Arizona, two;

Arkansas, one; California, 20; Colorado, three; Connecticut, one; Delaware, one; District of Columbia, one; Florida, two; Georgia, three; Idaho, five; Illinois, 11; Indiana, four; Iowa, one; Kansas, four; Kentucky, one; Maryland, five; Massachusetts, three; Michigan, four; Minnesota, four; Missouri, seven; Montana, one; Nebraska, one; New Hampshire, one; New Jersey, 15; New Mexico, one; New York, 97; Ohio, 18; Oklahoma, two; Oregon, one; Pennsylvania, 17; Rhode Island, one; Tennessee, three; Texas, three; Utah, one; Virginia, four; Washington, five; West Virginia, one and Wisconsin, four.

Science News Letter, February 7, 1948

ELECTRONICS

Recalls 400,000 Digits

➤ A NEW electronic calculator recently dedicated in New York combines the speed of electronic circuits with a "memory" capacity of 400,000 digits.

The latest brain child of the International Business Machines Corporation is equipped to utilize this speed and memory on the most complex problems of science. It combines for the first time electronic speed, vast memory capacity, and highly flexible and convenient programming facilities.

The over-all productive capacity of the Selective Sequence Electronic Calculator is reported to exceed that of any

other calculating machine in operation today. It can remember and recall automatically as required a total of nearly half a million digits.

Numbers that must be recalled most quickly are held in electronic circuits. The remainder are stored in relays and as holes in continuous cardstock tapes. By using punch cards as a supplementary medium of storage, the memory capacity is made almost limitless.

With this machine, located at the company's World Headquarters Building, 140,000 digits a minute can be read from punched tapes, 30,000 a minute



VAST MEMORY CAPACITY—This new electronic calculator can remember and recall automatically 400,000 digits. Its speed, memory capacity and flexible and convenient programming facilities will make it especially advantageous in the realm of science.

from punched cards. A total of 24,000 digits a minute can be recorded in printed form, 16,000 digits a minute can be noted as punched holes on cards.

The computing speeds of the latest IBM mechanical brain are as follows: It can add or subtract each second 3,500

numbers of 19 digits each; it can multiply each second 50 numbers of 14 digits each or divide 20 numbers of 14 digits.

The machine contains 12,500 electronic tubes, 21,400 relays and 40,000 pluggable connections.

Science News Letter, February 7, 1948

NUCLEAR PHYSICS

Is Test C To Be Secret?

➤ WILL "Test Charlie" be made a part of the top-secret atom-bomb experiments scheduled for the new mid-Pacific proving ground centered on Eniwetok atoll?

If this deep-water explosion, scheduled as part of the tests at Bikini but "postponed indefinitely," is restored to the program, it is highly improbable that the world will be told about it, as it was about tests A and B ("Able" and "Baker") in July of 1946. As a matter of permanent policy, all press and radio observers are excluded from the Eniwetok area.

It is possible, however, to form a reasonable conjecture of what such a test might be like, based partly on past experience, partly on present conditions and future possibilities.

Deep Water Test

Test C (or "Charlie") was originally planned to be held in deep water off Bikini, using such ships as were left after the first two tests, which were held within the lagoon. It was intended primarily to get a picture of the crushing effect on ships' hulls of an atom-bomb explosion in really deep water—a mile or more down. Since water is incompressible it was expected that this shock would be effective for a considerable distance; but existing physical and engineering tables do not suffice for a safe prediction of just what distance.

"Baker" test at Bikini was a submerged explosion, but a shallow one, for the depth of the lagoon at the center of the target array was only about 300 feet. All atoll lagoons are shallow, so if "Charlie" test is held in the Eniwetok area it will have to take place well out at sea—30 or 40 miles from the nearest island. If surface craft are tested, they will probably be held together with chains or cables. A practicable way to insure correct placing and depth of the bomb would be to suspend it on a mile or so of cable secured to one of the ships.

Value of a test against surface craft, however, would seem questionable at

present. The only surface navy of any size, outside of our own, is the British; and Britain, her great Continental rival gone and her overseas commitments much reduced, is now content to let supremacy rest with the U. S. Navy. In view of that fact, and of the additional fact that the survivor-ships at Bikini have all been taken either to Pearl Harbor or to the mainland Pacific coast, the expense and labor of setting up a target array of surface ships hardly seems worth while.

Naval tacticians might, however, want to try the weapon at depth against recent-type submarines. At the close of the war, Germany had developed a new U-boat design, said to be proof alike against radar detection and even the heaviest depth charges. It is rumored that the USSR has up to 300 of these craft, either taken over in the capture of German naval bases or completed since the war with the assistance of German technicians. Obviously, if the present "cold war" between the USA and the USSR should reach the shooting stage, these submarines would be the principal menace to our surface fleets and our merchant marine.

German Submarines Handy

We have a number of the late-type German submarines, as well as quantities of German plans and blueprints. A crushing test against such subs, with an atom-bomb as a super-depth-charge, might seem to be in order.

It would not be easy to arrange submerged U-boats for the test, but it probably could be managed. One of the biggest difficulties would be the salvaging of data from them if they were sunk in the test. A stove-in submarine would be highly interesting from a technical point of view, but on the bottom a couple of miles straight down would be rather inconvenient to board. It seems likely, therefore, that means would have to be devised to hold the damaged craft near the surface—possibly suspended from unsinkable floats—and perhaps haul

them up and put them into floating dry-docks after the explosion.

A test of this kind could probably be conducted in as nearly complete secrecy as is possible in this leaky world of ours. If surface ships of the Bikini target array should one day be missing from their berths, interested eyes might readily note their absence. But submarines are normally invisible and silent; they could proceed to the designated target spot under their own power and there be abandoned by their crews.

It is unlikely, too, that a mile-deep atom-bomb explosion would give news of its own occurrence. Probably no great amount of radioactive debris would reach the surface, and what the surrounding water would absorb would soon be so diffused in the vastness of the ocean that it would leave no trace.

Science News Letter, February 7, 1948

PHYSICS

Calculate Various Levels Of Temperature Above Earth

➤ IT'S 50 degrees hotter than boiling water 100 miles over your head. At 45 miles above the earth the temperature is 150 degrees Fahrenheit below zero. And it is the comfortable temperature of 70 degrees at 35 miles altitude, while in the atmospheric layer eight to 20 miles above the earth the average temperature is 75 degrees below zero.

One of the largest explosions in history, the destruction of Germany's Helgoland naval base with 5,000 tons of TNT on April 18 of last year, allowed Dr. Everett F. Cox of the Naval Ordnance Laboratory, Washington, to determine these temperatures. He announced them to the joint meeting of the American Physical Society and the Institute of Aeronautical Sciences, New York.

Noise from a great explosion does not reach distances of several hundred miles away until later than times calculated, assuming the sound travelled directly along the earth's surface. Around an explosion there are alternate zones of noise and silence.

Dr. Cox said that the best explanation of these skip-distances is that the sound waves travel upward until they hit a hotter layer of air high above the earth, where they are bent sufficiently to be reflected back to earth to form a noise ring. This sound is reflected by the earth and then goes up and down again to form another noise ring.

Using the observations of a special U. S. Navy expedition that observed the Helgoland blast at various points,

farthest of which was 620 miles away at Gorizia, Italy, Dr. Cox was able to calculate the temperatures at various altitudes. Sound at that distance had too low a frequency to be heard audibly.

The atmosphere 20 to 40 miles aloft is hotter than the air below because it has a larger amount of ozone, which absorbs the ultraviolet rays of the sun and heats the layer to a maximum of about 100 degrees Fahrenheit, depending upon the time of day, season and part of the earth. This ozone layer shields us from severe cases of sunburn.

A thin atmosphere layer 50 miles above the earth is colder than the ozonosphere but still higher the temperature rises again. V-2 rocket flights made during the past year confirm the upper air temperature records.

Science News Letter, February 7, 1948

BOTANY

Seed of Metasequoias Will Be Planted in U. S.

➤ TREES from earth's earlier ages, supposed to have become extinct with the last of the dinosaurs, will soon be growing in American botanic gardens. Seed collected from survivors found in a hidden valley of central China have been brought to the Arnold Arboretum of Harvard University, and will be planted there and in nine other tree collections in this country, as well as two in England.

The tree, which is a fairly close relative of the redwoods or sequoias of California, has long been known from its fossil remains, for it had world-wide distribution millions of years ago. Metasequoia was the name given to it by botanists on the basis of these fossils. Now living metasequoias have been found.

The discovery was first announced about two years ago, by Chinese botanists who at first thought the tree was a peculiar kind of fir. As soon as identification of their specimens showed what a rare botanic treasure they had found, Prof. E. D. Merrill, long director of the Arnold Arboretum, arranged for an expedition to collect seed for planting in as many places as possible, to insure continued survival of the species.

According to the Chinese descriptions, metasequoia trees grow over 100 feet high and have trunks seven and one-half feet in diameter. Unlike the American sequoias, but like the American larch or tamarack and the swamp cypress, they shed their foliage in winter.

Science News Letter, February 7, 1948

MEDICINE

Drug Relieves Allergies

"Decapryn," new antihistaminic agent, has completely relieved 80% of hay fever patients and over 85% of patients with hives. Unpredictable in bronchial asthma.

➤ A NEW histamine antagonist called "Decapryn" has been developed which is a valuable addition to the antihistaminic or antiallergic agents now available for the management of allergic conditions. Dr. Fred W. Wittich, secretary-treasurer of the American College of Allergists, announced.

The new histamine antagonist was developed in the research laboratories of the Wm. S. Merrell Company, and its advantages and uses were reported by Dr. Ethan Allan Brown of Boston, Mass., and his colleagues (*Annals of Allergy*).

Approximately 80% of all allergic symptoms were relieved by Decapryn. Analysis of results showed that 80% of patients with typical hay fever and over 85% of patients with urticaria or angioneurotic edema were completely relieved. In bronchial asthma, the effects, as with other antihistaminic drugs, are quite unpredictable. Of 54 patients, 30% were

markedly relieved, 40% were moderately relieved. In the remainder there was no noticeable relief, although in the group with associated nasal symptoms, a good number were relieved of these latter.

Drowsiness was the most common side action encountered. It was observed in about one patient out of six. Of the total number of 23 patients who reported disturbing side actions, 15 were in the asthma group, who received comparatively excessive dosage. Reactions in the remaining eight patients were moderate in five and severe in three. On the basis of a dose of 12.5 to 25 milligrams, used in treating patients other than the asthmatics, reactions occur much less frequently, probably in fewer than 10%.

Further studies on the effects of Decapryn on cutaneous whealing response and other clinical evaluations are in progress and will be reported upon separately in the near future.

Science News Letter, February 7, 1948



RADIATION DWARFS COTTON—Hereditary changes are evident in the squat, compact plant on the left which grew from a seed which had been exposed to gamma radiation on the deck of a ship on "Able" day at Bikini. The plant on the right, grown from the same strain but from an unexposed seed, is less dense and taller. Plants from most treated seeds grown at the Texas Agricultural Experiment Station by Dr. Meta S. Brown, that sprouted at all, were nearly normal in appearance, but radical changes in the chromosomes in their cells were rather general.

Directions: Four possible answers are given for each question. Put an \times in the answer box corresponding to the number of that answer which you think is most nearly correct.

- 1 A statement of equality between two ratios is known as a
☐ 1 fraction
☐ 2 quotient
☐ 3 percentage
☐ 4 proportion

- 2 This is a diagram of a spring similar to a hair spring in a watch. It is classified as a
☐ 1 compression spring
☐ 2 disk spring
☐ 3 leaf spring
☐ 4 torsion spring



- 3 Which of the following elements is chemically least like the other three?
☐ 1. argon
☐ 2. chlorine
☐ 3. krypton
☐ 4. neon

- 4 The gravitational attraction between two homogeneous spheres varies inversely as the square of the distance between
☐ 1. their centers
☐ 2. their farthest surfaces
☐ 3. their nearest surfaces
☐ 4. them and the ground

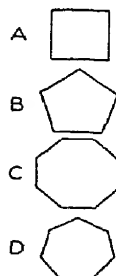
- 5 Which word belongs least with the other three?
☐ 1. calyx
☐ 2. corona
☐ 3. stamens
☐ 4. stigma

- 6 In a general sense, a process of transferring energy from a body across space is called
☐ 1. elasticity
☐ 2. magnetism
☐ 3. polarization
☐ 4. radiation

- 7 The gaseous envelope surrounding a celestial body is called
☐ 1. air
☐ 2. atmosphere
☐ 3. humidity
☐ 4. vapor

8. A is a square,
 B is a pentagon,
 and C is an octagon.
 D is a

- ☐ 1. decagon
☐ 2. heptagon
☐ 3. hexagon
☐ 4. nonagon



9. Which of the following is true?

☐ 1. $(3 \times 6) \left(\frac{1}{3}\right) = \left(\frac{3}{3}\right) \left(\frac{6}{3}\right)$

☐ 2. $\frac{(10-4)}{2} = 5 - 4$

☐ 3. $\frac{9 \times 4}{3 \times 2} \times \frac{4}{3} = \left(\frac{9}{3}\right) \left(\frac{4}{2}\right) \left(\frac{12}{9}\right)$

☐ 4. $\frac{(3)(3 \times 3)}{\frac{1}{3}} = 1 \times 3 \times 3$

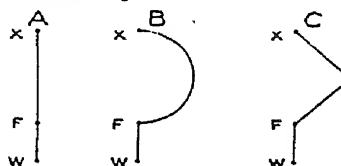
- 10 A village was considering a standpipe to produce pressure for its water supply. Four standpipes were considered with characteristics as shown below. Which would produce the greatest pressure at street level?

- ☐ 1. average height of water surface above the street 50 feet, diameter of standpipe 20 feet
☐ 2. average height 60 feet, diameter of standpipe 17 feet
☐ 3. average height 70 feet, diameter of standpipe 15 feet
☐ 4. average height 80 feet, diameter of standpipe 13½ feet

11. Which of the following terms has least in common with the other three?

- ☐ 1. fluorescence
☐ 2. incandescence
☐ 3. luminescence
☐ 4. phosphorescence

- 12 Disregarding friction, which of the arrangements of levers would give the greatest mechanical advantage? In each the force is applied at point X, and the fulcrum is indicated by F.

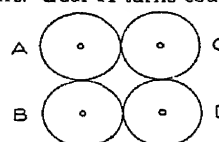


- ☐ 1. A
☐ 2. B
☐ 3. C
☐ 4. the same advantage for each

- 13 Which of the following pairs of things are most similar?

- ☐ 1. aero-embolism; bends
☐ 2. anoxia; anemia
☐ 3. DDT; 2,4D
☐ 4. hyperopia; presbyopia

14. All of the gears in the accompanying gear system have the same number of teeth. Each gear is in mesh with two other gears. Gear A turns counterclockwise



Which of the following statements is correct?

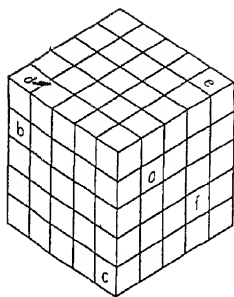
- ☐ 1. Gears A and C turn in the same direction
☐ 2. Gears A and D turn in the same direction
☐ 3. Such a gear system cannot operate
☐ 4. Such a gear system would be useless

PART A

PART B

SECTION E: A 2½ inch cube, as shown in the diagram, is made of half-inch cubes. Any one cube may be located in terms of a coordinate system. For example, cube *a* is in the fifth layer from the left, the fourth layer from the bottom, and the second from the front. It is, therefore, located in the position 5,4,2.

SCIENCE APTITUDE TEST—This sample contains typical questions taken from the original three-hour examination given to high school seniors in the Seventh Annual Science Talent Search conducted by Science Clubs of America, administered by Science Service. The test was devised by Dr. Harold A. Edgerton, and Dr. Steuart Henderson Britt, psychologists of New York City. If you wish to take this test arrange to spend about 40 minutes of uninterrupted time. Then turn to page 92 for the answers.



QUESTIONS FOR SECTION E.

65. If the entire exterior surface is painted blue, what is the largest cube which can be built from the unpainted cubes?
- () 1. 1-inch cube
() 2. $1\frac{1}{2}$ -inch cube
() 3. 2-inch cube
() 4. $2\frac{1}{2}$ -inch cube
66. The coordinate of the cube nearest the center of the cube shown in the diagram are
- () 1. 1,1,1
() 2. 2,2,2
() 3. 3,3,3
() 4. 5,5,5
67. What are the coordinates of the cube which would have two holes in it if a hole $\frac{1}{4}$ of an inch in diameter were drilled from cube 2,4,1 through cube 2,4,5 and a similar hole from cube 5,4,3 through 1,4,3?
- () 1. 1,3,4
() 2. 2,4,3
() 3. 3,3,3
() 4. 5,4,1

SECTION I Suppose a number system were instituted which had eight digits $\square, \Delta, Z, \Sigma, \text{A}, \text{B}, \text{C}$ corresponding respectively to the digits 0, 1, 2, 3, 4, 5, 6, and 7. The digit \square is used in the same fashion as the 0 in the decimal system, e.g., $\Delta\square = 8$

QUESTIONS ON SECTION I

85. Which is equal to 8×8 ?
- () 1. $\Delta\square\square$
() 2. AB
() 3. $\Delta\square\Delta$
() 4. $\Sigma\Sigma$
86. What is the sum of $\text{A} + \text{B} + \Sigma$?
- () 1. $Z\Delta$
() 2. $\Delta\Sigma$
() 3. ΣA
() 4. ΔB
87. Which of the following indicates three-quarters of an inch?
- () 1. $\frac{\Sigma}{\Delta\square}$ inches
() 2. $\frac{\text{A}}{\Delta\square}$ inches
() 3. $\frac{\Sigma}{\Delta}$ inches
() 4. $\frac{\Sigma\Sigma}{\Delta\square}$ inches
88. What is the value of $\Delta Z \text{A} - \text{A}\Sigma + \frac{\Delta\square}{Z}$?
- () 1. AB
() 2. $\Sigma\Sigma$
() 3. $\text{A}\Sigma$
() 4. $\Sigma\square$

PART C

Below are a number of statements, some of which are true and some false. Mark each true statement with an X. Mark each false statement O.

- () 101. A square jaw is a sign of will power
- () 102. Certain lines in a person's hand foretell his future.
- () 103. Children who are distinctly above average in intelligence and school grades more often than not are above average in height and weight.
- () 104. Criminals are very rarely above average in intelligence
- () 105. Human beings have to learn to fear snakes and mice, that is, the fear is not inborn.
- () 106. In general, women have smaller brains than men.
- () 107. Many eminent men have been feeble-minded as children.
- () 108. The brain is divided into definite sections, each of which controls some special ability or trait such as intelligence, cheerfulness, etc.
- () 109. The marriage of cousins is practically certain to result in children of inferior intelligence.
- () 110. The number of man's senses is limited to five.
- () 111. We forget more rapidly when awake than when asleep.
- () 112. Many of the artificial radioactive isotopes of ordinary elements are useful for tracer experiments in chemistry, physics, biochemistry, and medicine.
- () 113. Transmutation of gold into mercury by cyclotron bombardments has provided a new standard for length measurements in grinding lenses and testing optical equipment
- () 114. Radon, a radioactive gas, generated by the second atomic bomb at Bikini, was detected in the atmosphere over part of the midwestern United States three days later.
- () 115. Injection of liquid oxygen have been found not to increase the power of aircraft engines for sudden spurts.
- () 116. A cloud detector that shows invisible dangerous clouds through use of infra-red rays has been devised to make night flying safer.
- () 117. Treating parent spots with mustard gas has produced new physiological varieties of a fungus
- () 118. The supersonic songs of grasshoppers, measured with a special meter and found to be at frequencies around 40,000 vibrations per second, can be heard by children.
- () 119. In a recent experiment, dry-ice fragments against a cloud of undercooled droplets in a laboratory cold chamber formed ice crystals that fell like snow.

137. 1 meter equals 39.37 inches. Therefore, 1 square inch equals how many square meters?
- _____
- _____

138. Logically, what word is represented by the symbol Δ in the series: kiloliter, hectoliter, decaliter, liter, deciliter, Δ , milliliter.
- _____
- _____

139. What is the missing word in the following sentence? "A figure is _____ with respect to a straight line l if the points of the figure can be grouped in pairs in such a way that the straight-line segment joining any pair has l as a perpendicular bisector."
- _____
- _____

140. If the proposition "All X are Y" is universal and positive, and if the proposition "Some X are Y" is particular and positive, what two conclusions can be drawn about the proposition, "No X are Y"?
- _____
- _____

141. What is the error, and in which step or steps is it made?
- (1) Let $x = a$
(2) Then $x' = ax$
(3) $x' - a' = ax - a'$
(4) $(x + a)(x - a) = a(x - a)$
(5) $x + a = a$
(6) Since $x = a$, we have
(7) $a + a = a$
(8) $2a = a$
(9) $2 = 1$
- _____
- _____

GENERAL SCIENCE

Test Your Science Ability With Sample Problems

➤ HERE'S a test that you can try on yourself or your friends. You may discover that you have the reasoning ability that a scientist needs in order to tackle and solve his investigational problems.

Thousands of high school seniors have just taken the science aptitude test, of which these questions are a part. They were competing in the Seventh Annual Science Talent Search for the Westinghouse Scholarships, and a tough superquiz was part of their entry.

The questions, now made public for the first time, require the use of scientific ability or aptitude. Not everyone has the qualities that make a successful scientist, just as not everyone can sing, paint or learn languages easily. If you find the test difficult, no matter! In any case, you should get some idea of what it takes to be a scientist. You may even discover that you have abilities that you did not realize you have.

Do you want to try the test? Then arrange to spend about 40 minutes of uninterrupted time. All of the questions should be finished in one sitting. When you are through, turn to the answers on page 92.

Now a few hints about taking the test:

Don't expect to make a perfect score. No one of the thousands of boys and girls who have taken Science Talent Search examinations has ever made a perfect score. They are not expected to do so. Neither are you.

You may start in on the test and then not finish. Or you may take one look at it and say: "That is too tough for me." That is your privilege. No one is making you take the test.

The high school seniors were not required to take the test. They could walk out on it—and many of them did, thus withdrawing from the competition.

The test is made quite difficult intentionally in order to eliminate the persons who do not have perseverance to finish a job. This ability to finish what is started is a prime requisite for solving scientific problems, whether they be in atomic energy, disease control, industrial technology or in everyday life. Sometimes those who quit have reasoning ability, but it isn't useful to them unless they try to use it.

Doing well on this sample of the full test (which takes three hours to do) is (Turn to page 92)

ENGINEERING

Canals Retain Importance

Because they are inexpensive compared to other modes of transportation, they are still being used for freight that doesn't require faster transport.

By A. C. MONAHAN

➤ CANAL transportation is here to stay. Moving freight through canals may be slow but it is relatively cheap. A single mule can tow through water as heavy a load as a locomotive can pull on its steel track.

Most of the inland dug ditches will remain important routes for freight in spite of competition with railways, highways and airways. It is true that many early American canals were made obsolete by railroads relatively soon after railroading came into existence, but rails have not replaced many modern man-made waterways.

Shipping canals for ocean vessels are in another class. These permit ocean boats to travel far inland on rivers made navigable by dredging, or they are inter-ocean waterways such as the Panama and the Suez canals. These famous water routes may soon have competitors, but it will be friendly water competition made necessary by increased traffic and the possibilities of future wars. They are first objectives in any world war.

Rival Suez and Panama

Behind the reasons advanced for a rival Suez and rival Panama are increased transportation needs, political necessity and possible warfare. These greatest and most important of all shipping canals are located in regions foreign to the countries that use them most. This creates a special situation.

Another canal through the neck of land that connects the two Americas, either in Colombia or Nicaragua, is possible and feasible both from engineering and economic standpoints. A canal from the Mediterranean to the Red Sea by way of Palestine is reported proposed by British engineers. It is wanted before the Suez passes to the control of Egypt.

A canal from the Nile to the Red Sea would provide a second route to the Suez but it would be in Egypt. It could follow the route where a canal was built as early as 1380 B. C., according to ancient historians. There is not much evidence to support the claim, but it is known there were several canals from

the Nile to the Red Sea in early Christian centuries.

The Amr is the best known of these. Amr was the Arab conqueror of Egypt in the 7th century. The Amr canal was open at various times but closed for long periods in its history. Part of it is now used to carry fresh water from the Nile to the city of Suez on the Red Sea.

Use of Man-Made Canals

The use of man-made canals in other continents also dates back many centuries. The Grand Canal of China is one of those most important historically. It was constructed in the 13th century, for transportation and irrigation, and connects the Pei-Ho and Yangtse-Kiang rivers.

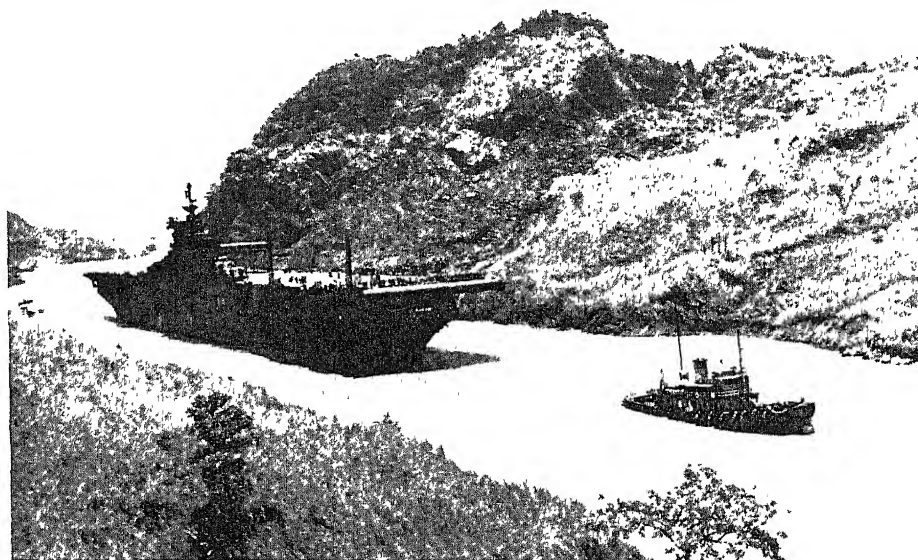
Charlemagne (742-814) is said to have proposed a canal to connect the Rhine with the Danube by way of the Main river and the now-American-occupied part of Germany. The present canal, which provides a waterway from the

North Sea to the Black Sea, was begun by Germany in 1921.

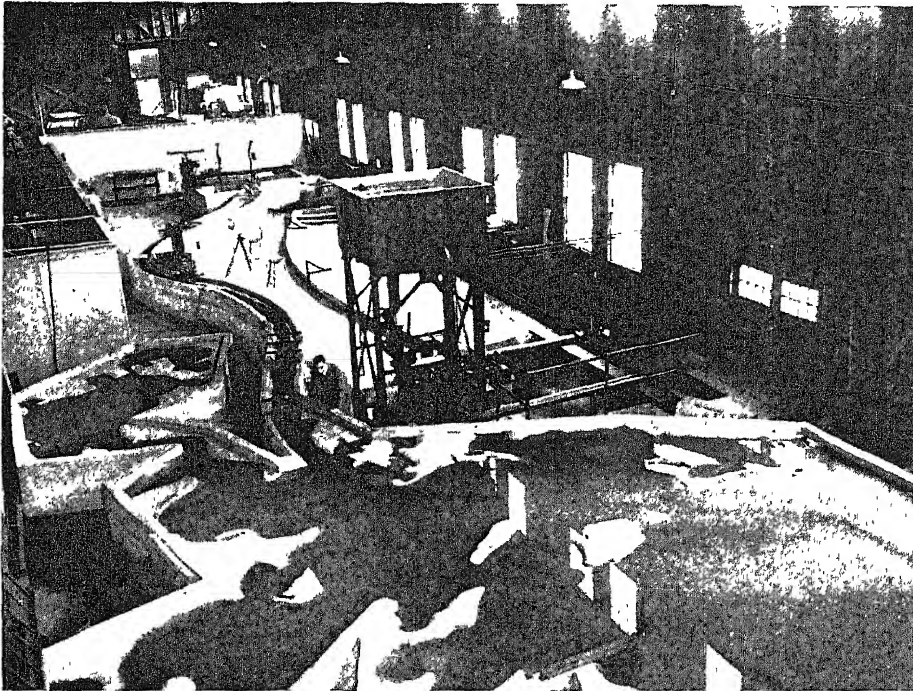
Western Europe for many years has been criss-crossed with thousands of miles of barge canals, and probably half the freight in Germany and France in prewar days moved by water. European canals felt the competition of railroads far less than those in early America. About one-half the former 5,000 miles of inland canals in this country are now closed because of railways. Included among the closed water routes is the first canal constructed in this country. It was at South Hadley, Mass., and was dug in 1792-96.

America's great interest in internal waterways has been in making rivers navigable, even for long distances inland from the ocean. Some 24,000 miles of United States rivers have already been canalized by straightening, deepening and providing with locks. There will be more later.

The Panama and the Suez are unique among the world's shipping canals because of their positions and their strategic value in war times. They provide the former missing links in the short round-the-world water route. Their greatest value since construction has



INTEROCEAN TRAVEL—Man-made waterways permit ocean vessels such as the U. S. S. Boxer, shown here, to be towed through the Panama Canal for interocean transportation.



CANAL MODEL—Modern technology requires laboratory studies with models such as the relief of the Cape Cod Canal, shown in this picture, which Massachusetts Institute of Technology engineers built to observe the effects of rising and falling tides.

been commercial, but their war value has been recently emphasized.

How important they are is evidenced by the part the Suez played in both world wars. It will be remembered that during World War II, when Russia was desperately in need of American supplies to stem the Nazi invasion of the Soviet Union, American vessels were forced to round the coast of South Africa to reach the Persian Gulf. It will be remembered also that the Panama Canal was an important objective of the Japs, which fortunately they never reached.

Suez Internationally Managed

The Suez, formally opened to traffic in 1869, is under international management of a board composed of French, English and Dutch representatives. In theory, it is always "open, in time of war as in time of peace, to every vessel of commerce or of war, without distinction of flag." The concession granted by Egypt for the canal expires in 1968. Certain British statesmen now feel that a new canal, not crossing Egypt, should be built and ready for use before that date.

One proposal, that has been made public in London, is a canal across Palestine near its southern border. It would extend from Gaza on the Mediterranean to the upper end of the Gulf of

Aqaba (Akaba), an arm of the Red Sea with a northern extremity touching both Palestine and Trans-Jordan. It would be 40% to 50% longer than the 100-mile Suez, and probably would have locks where it would cross highlands in eastern Palestine.

The war value of two separated canals to connect the Mediterranean and the Red Sea is self-evident. For peace-time purposes, the value is not as evident, but it must be remembered that the greatest oil fields yet discovered are in Asia Minor in the general area adjoining the Gulf of Persia. The development of these fields means greatly increased Mediterranean traffic. The oil mined can be piped to Mediterranean ports, but the supplies and equipment needed in the oil fields and by their thousands of employees must reach them by boat to ports on the Persian gulf.

Panama Canal Is Vulnerable

The Panama canal has served its purpose well since opened in 1914, but it will soon be unable to meet growing commercial demands. It is not wide enough for some of the new vessels, and it is vulnerable to enemy destruction, particularly from airborne bombs. When built, aerial bombing was practically unknown, and the atomic bomb was un-

dreamed of, except perhaps in the minds of a few advanced scientists.

One proposal is to widen, deepen and straighten the present canal, building new locks with greater width. A second is to replace it with a sealevel canal, following in part only the present route. A third is to open an entirely new canal, neither in the Canal Zone nor in Panama, to provide a waterway for the largest ships and to lessen danger from enemy attack.

The present canal, which cost in the neighborhood of \$500,000,000, has triple locks near each end to raise or lower vessels some 85 feet to or from the main section of the route across the high land of the isthmus. It is these locks that are vulnerable to enemy bombs; one well-placed bomb could put the canal out of use for three to five years.

The proposed sealevel canal would be lockless except for one low construction to handle the approximately one-foot different tide elevations of the two oceans. The canal would be from 200 to 750 feet wide, and its bottom would be 65 feet below sealevel. Its cost would be perhaps five times that of the present canal, but it would probably cost less to maintain. Without locks travel through it would require much less time.

Several sites outside of Panama have been suggested for the building of a new canal. One is in northern Colombia not far from the Panama border. Another is the Nicaraguan route, where it was first planned to build the original inter-oceanic waterway. It is still available. An American option, acquired in 1916 for \$3,000,000, is still in force.

Nicaraguan officials have recently offered America full cooperation in building a shipping canal through their country. They promise also the necessary bases to defend it.

Science News Letter, February 7, 1948

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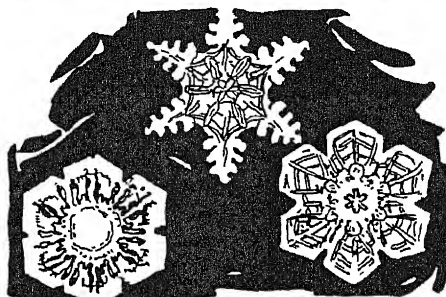


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Eskimos and Wheat

➤ SNOW is the friend of migratory Eskimos in the long Arctic winter, just as it is of the rooted wheat in this more favored land. When a little band of Eskimos decide to make camp, they quickly build a perfectly domed igloo out of blocks of packed snow. When there is a thick cover of snow over the wheat-fields, farmers stop worrying about the crop.

The same physical property of snow benefits both frigid-zone men and temperate-zone plants, though not in exactly the same way. The structure of snow crystals, as spiky six-pointed stars, insures that massed snow on the ground shall be highly porous and fluffy, with a great deal of trapped air. This makes snow a good thermal insulator, for exactly the same reason that such things as rock wool, felt and cork are good insulators. As a matter of fact, up to the temperature where it partly melts and then re-freezes into solid ice, snow is a better insulator, weight for weight, than most commercial products used for that purpose.

Not that it is warm under the snow. It cannot be, else the snow would melt. But it is less cold than it is in the outer air, and the wind does not reach the living creatures within its shelter. The latter point is of especial importance in the case of the wheat, for it is probable that plants suffer even more from drying out than from freezing when they are naked to the winter weather. Another important benefit of snow-insulation for the plants it covers is its prevention of too-rapid changes in temperature, either up or down, which can harm plants in a number of different ways.

The snow-sheltered Eskimos do warm up the inside of the igloo to some extent, partly with their blubber-fed stone lamps, partly with animal heat from their own robust bodies. They even keep themselves warm when lying on the snow sleeping-bench, by inserting a layer of a different kind of insulator—furs. But they must not make the interior so hot that the snow walls begin to melt, then re-freeze; for ice, unlike snow, is a rather good conductor of heat. You ruin the igloo if you make it too warm inside.

Exactly this has been happening, among Eskimos who have obtained kerosene stoves from white traders. After the excessive warmth has changed the igloo from a snow house into an ice house, it loses much of its value as a shelter, and the inhabitants are liable to contract tuberculosis and other lung ailments. Since the trade in stoves cannot be stopped, missionaries in the Arctic now try to persuade the Eskimos to use their summer skin tents as linings for their igloos, thereby preserving the insulating value of the snow blocks.

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credible, but it does not mean that you can quit what you are doing and become a scientist. To be a professional scientist requires many years of study and preparation as well as native ability. But there are many situations in your daily work and life that require the same kinds of ability that scientists need.

The science aptitude test is only one of the techniques used in selecting boys and girls who are scientifically gifted. In addition each contestant filled out a personal data blank and wrote an essay describing some scientific project he has done or wishes to do. Teachers filled out

a recommendation form and principals reported scholarship. All these are used in choosing winners.

Taking the test and competing in the search comes as a culmination of high school science study and science club activity for thousands of boys and girls of America's public, private and parochial secondary schools.

Don't read further. Cover up the following paragraph until you have taken the test.

The correct answers to Part A are: 1, 4; 2, 4; 3, 2; 4, 1; 5, 2; 6, 4; 7, 2; 8, 2; 9, 3; 10, 4; 11, 2; 12, 4; 13, 1; and 14, 2. Right answers for Part B are 65, 2; 66, 3; and 67, 2. 85, 1; 86, 2; 87, 2; 88, 3.

Your true and false answers should read: 101, 0; 102, 0; 103, X; 104, 0; 105, X; 106, X; 107, 0; 108, 0; 109, 0; 110, 0; 111, X; 112, X; 113, X; 114, X; 115, 0; 116, X; 117, X; 118, 0; 119, X.

On the last questions, you may take credit if your answer was in different words, but be sure it means the same as the correct ones. They are: 137. One over 39.37 squared; 138. Centiliter or .01 liters; 139. Symmetric or symmetrical; 140. Universal and negative; 141. Both sides were divided by zero in going from step four to step five, which results in an indeterminate form.

Your score is the number of questions you answered correctly. If you only answered 20 or less correctly, you probably are not gifted in science. But if you scored 33 or more, then you may have a real talent for science. Average aptitude is indicated by scores ranging from 21 to 32 inclusive.

Now, let's go back over the answers and see which questions you answered correctly. You should have been right on 1, 3, 7, 8, 101, 102, 105 and 112. Those are rated as the easiest ones.

Which ones did you puzzle over most? The hardest questions are 13, 85, 88, 103, 106, 108, 110, 113, 137 and 140.

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PUZZLING FASCINATING

"THE TOWER OF HANOI"

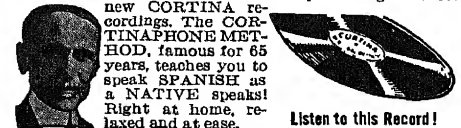
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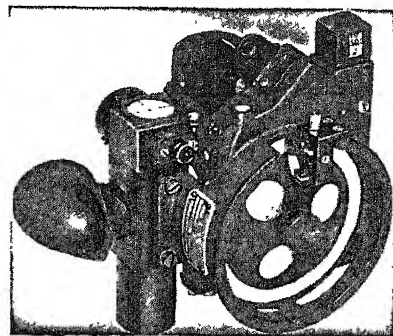
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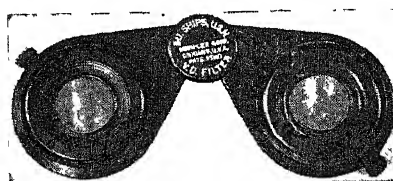
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THE ALPHA-KETO ACIDS—Kenneth L. Waters—*Mellon Institute*, 14 p., paper, free from publisher—Pittsburgh 13, Pa. Excellent bibliography.

ANATOMY AND PHYSIOLOGY LABORATORY MANUAL AND STUDY GUIDE—Barry Griffith King and Helen Maria Roser—*Saunders*, 3rd ed., 267 p., illus., \$3.00. Includes paper-bound Instructors' Supplement at no additional charge.

BIBLIOGRAPHY AND INDEX OF GEOLOGY EXCLUSIVE OF NORTH AMERICA: Vol. II, 1945-1946—Marie Siegrist and Eleanor Tatge—*Geological Society of America*, 474 p., \$3.25.

BLUE CROSS AND MEDICAL SERVICE PLANS—Louis S. Reed—*U. S. Public Health Service*, 323 p., illus., paper, free from Public Inquiries Section, U. S. Public Health Service, Washington 25, D. C.

THE CASE BOOK OF A MEDICAL PSYCHOLOGIST—Charles Berg—*Norton*, 260 p., \$3.50. Twenty-five case studies from the practice of a British psychiatrist.

CATALOGUE OF TYPE SPECIMENS OF FISHES IN CHICAGO NATURAL HISTORY MUSEUM—Marion Grey—*Chicago Natural History Museum, Fieldiana: Zoology*, Vol. 32, No. 3, 96 p., paper, illus., \$1.25.

CAUSES OF CATASTROPHE: Earthquakes, Volcanoes, Tidal Waves, and Hurricanes—L. Don Leet—*Whittlesey House*, 232 p., illus., \$3.00. A seismologist gives the layman an understanding of those tremendous happenings of nature.

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DISCOVERING OUR WORLD: Book 3—Wilbur L. Beauchamp, Mary Melrose Williams and Glenn O. Blough—*Scott, Foresman*, 304 p., illus., \$1.64. One of the Basic Studies in Science. Gorgeously illustrated in color this book answers the common questions of children about science. It is intended for Grade 6.

DOCTOR FREUD: An Analysis and a Warning—Emil Ludwig—*Hellman, Williams*, 317 p., \$3.00. A well-known biographer sees in Freud's teachings a peril as typically American as Wagner's was German. This is a specially adapted American edition of a work originally written in German.

EXPERIMENTAL AIR-BORNE INFECTION—Theodor Rosebury—*Williams and Wilkins*, 222 p., illus., \$4.00. Report of a wartime study of primary interest to those concerned with the prevention of epidemics or with bacteriological warfare. First volume of Microbiological Monographs.

FACTORS IN BOTANICAL PUBLICATION AND OTHER ESSAYS—Neil E. Steven—*Chronica Botanica*, Vol. II, No. 3, 87 p., paper, \$2.00.

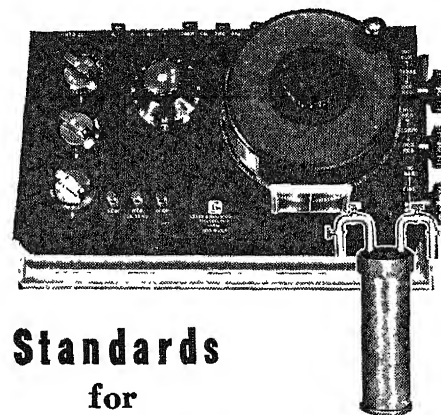
FREE FILMS: 16 mm Silent and Sound—Lili Heimers—*N. J. State Teachers College*, 40 p., paper, \$1.00.

FUN WITH YOUR CAMERA: Practical Chats on Amateur Camera Activity—Jacob Deschin—*Whittlesey*, 264 p., illus., \$3.00. A book for camera enthusiasts covering not only picture taking but darkroom procedures and the winning of contests.

HEARING AIDS AND AUDIOMETERS—Report of the Committee on Electro-Acoustics—*British Information Service, Medical Research Council Special Report Series No. 261*, 71 p., paper, illus., 45 cents.

A HISTORICAL APPRAISAL OF MECHANICS—Harvey F. Girvin—*Int. Textbook*, 275 p., \$3.25. A well written treatise for students and workers in technology, focusing attention upon the importance of the history of mechanics in engineering education.

HOW TO MAKE AND USE A SMALL CHEMICAL LABORATORY—Raymond Francis Yates—*Norman W. Henley*, 140 p., illus., paper, \$1.00. A new and revised edition.



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HOW WELL CAN MANAGEMENT PREDICT? An Examination of Prognostic Research, Its Utility and Limitations—William A. Hamor—*Mellon Institute*, 6 p., paper, free from publisher: Pittsburgh 13, Pa.

LIFE: Its Nature and Origin—Jerome Alexander—*Reinhold*, 291 p., illus., \$5.00. Life, the author believes, is dominated by catalysis—catalysts not only dominating the chemical changes essential to life, but constituting ultimate living units. Many fields of science are involved in the discussion.

MEDICINE TODAY The March of Medicine, 1946—*Columbia Univ. Press*, 177 p., \$2.00. No. XI of the New York Academy of Medicine Lectures to the Laity. They cover a variety of subjects having to do with medical economics, education and research.

MODERN COSMETICOLOGY—Ralph G. Harry—*Chemical Pub. Co.*, 3d ed. rev., 515 p., illus., \$12.00. A technical book.

THE NATIONAL RESEARCH COUNCIL REVIEW FOR 1946—*National Research Council, Canada*, No. 1641, 146 p., paper, 75 cents.

NEW METHOD FOR TESTING CATALYSTS—J. A. Hinckley, Jr. and Harry R. Shepard, Jr.—*Mellon Institute*, 3 p., paper, illus., free from publisher: Pittsburgh 13, Pa.

1000 AMERICANS—George Seldes—*Boni & Gaer*, 312 p., \$3.00. The editor of the newsletter "In Fact" writes about "Big Powers, Big Magazines, Big Business and Big Reaction" which he feels control the economy of this country.

OUR STATE BIRDS—Mary I. Curtis—*Lyons & Carnahan*, 122 p., illus., \$1.20. A book for children, nicely illustrated with drawings and colored plates.

POPULAR MECHANICS FARM MANUAL—Editors, *Popular Mechanics*—*Popular Mechanics Press*, 284 p., illus., \$3.00. A collection of how-to-do-it articles of special interest to the farmer profusely illustrated with photographs and diagrams.

THE REHABILITATION OF SPEECH—Robert West, Lou Kennedy and Anna Carr—*Harper*, rev. ed., 650 p., illus., \$5.00. A book for students and professional workers in the field of speech pathology and voice disorder.

REPORT OF THE SECRETARY OF THE SMITHSONIAN INSTITUTION AND FINANCIAL REPORT OF THE EXECUTIVE COMMITTEE OF THE BOARD OF REGENTS FOR THE YEAR ENDED JUNE 30, 1947—*Govt. Printing Office*, 169 p., paper, 75 cents.

THE SECOND REPORT OF THE UNITED NATIONS ATOMIC ENERGY COMMISSION TO THE SECURITY COUNCIL, Sept. 11, 1947—*Govt. Printing*, Dept. of State Publication 2932, 106 p., paper, 30 cents.

SOME NOTES ON THE PSYCHOLOGY OF PIERRE JANET—Elton Mayo—*Harvard University Press*, 132 p., \$2.50. Discussion of those aspects of the work of Janet believed to be of special interest to students of industrial and social psychology.

SURVIVAL IN THE AIR AGE—*Govt. Printing Office*, 166 p., paper, 75 cents. A report by the President's Air Policy Commission.

SYSTEM FOR RAPID EVALUATION OF CATALYSTS FOR PRODUCTION OF BUTADIENE FROM ETHANOL—M. H. Whitlock, G. J. Haddad, and E. E. Stahly—

Mellon Institute, 4 p., illus., paper, free from publisher: Pittsburgh 13, Pa.

TERTIARY NAUOIDS OF THE AMERICAS—A. K. Miller—*Geological Society of America*, Memoir 23. 234 p., illus., \$4.50. A handsomely illustrated technical report.

TEXTBOOK OF EMBRYOLOGY—Harvey Ernest Jordan and James Ernest Kindred—*Appleton-Century*, 5th ed., 613 p., illus., \$7.50. For medical and premedical students.

TEXTILE BRAND NAMES DICTIONARY—*Textile Book Pub.* 1st ed., 377 p., illus \$6.00.

THOMAS JEFFERSON AMONG THE ARTS—An Essay in Early American Esthetics—Eleanor Davidson Berman—*Philosophical Library*, 305 p., illus., \$3.75. New light on the life of a man who was scientist as well as artist and statesman.

ASTRONOMY-RADIO

Meteors Tell of Upper Air

➤ "SHOOTING STARS," those pinheads of stone or iron that frequently flash across the sky, are helping radio experts learn more about the upper atmosphere.

The heat generated by meteors racing through the rarefied air at a rate of 40 miles or so per second is sufficient to vaporize the smaller meteors so that they burn themselves out. But along the path they traveled is left a trail of hot ionized gases. What you see in the heavens is this trail of hot gases rather than the meteor itself.

These gases and others perhaps not so bright adjacent to the path the meteor followed 60 to 200 miles above the earth are highly ionized. Meteors travel with such high velocities that they are capable of producing ion trails tens of miles long and possibly even a half mile in diameter. Dr. A. G. McNish of the Central Radio Propagation Laboratory, National Bureau of Standards, told members of the Philosophical Society of Washington.

Instead of letting radio waves go through to the normal reflecting layer in the upper atmosphere, these ionized meteor trails reflect back to the earth radio waves of low frequency, letting high-frequency waves slip through. These reflected waves appear as large "pips" on the radar scope.

These reflections have been observed on radar sets using frequencies of 100 megacycles or lower, but are never picked up on frequencies as high as 3,000 megacycles. Observations were made at the Bureau's radio station at Sterling, Va., under the direction of V. C. Pineo.

The temporary ionization produced by the impact of meteors on the upper

THE UNITED STATES AND RUSSIA—Vera Micheles Dean—*Harvard University Press*, 321 p., \$3.00. A thoughtful appraisal leading up to the answer to today's difficult question, is war inevitable? The author suggests possible means of averting it.

THE WEB OF GOVERNMENT—R. M. MacIver—*Macmillan*, 498 p., \$4.50. A Scotch-born sociologist, now professor of political sociology at Columbia University, writes on the philosophy of government.

WHAT TO MAKE FOR CHILDREN—*Popular Mechanics*, 110 p., illus., \$2.00. A variety of ways for the hobbyist-father to keep busy building furniture and playthings.

WORLD GEOGRAPHY—E. L. Thurston and E. H. Faigle—*Iroquois Pub. Co.*, rev. and enlarged ed., 359 p., illus., \$2.88. A postwar geography for grades seven and eight.

Science News Letter, February 7, 1948

atmosphere gives a good opportunity for studying how electrons that have been knocked out of atoms recombine. It helps scientists understand how the ionosphere propagates radio waves.

Science News Letter, February 7, 1948

LINGUAPHONE



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• New Machines and Gadgets •

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✿ **PORTABLE TYPEWRITER**, which weighs only 8.5 pounds and is about three inches high when in use, is British-built, writes a nine-inch line in pica characters, and can be used to make five or six carbon copies. It has a standard keyboard and takes full-length half-wide ribbon.

Science News Letter, February 7, 1948

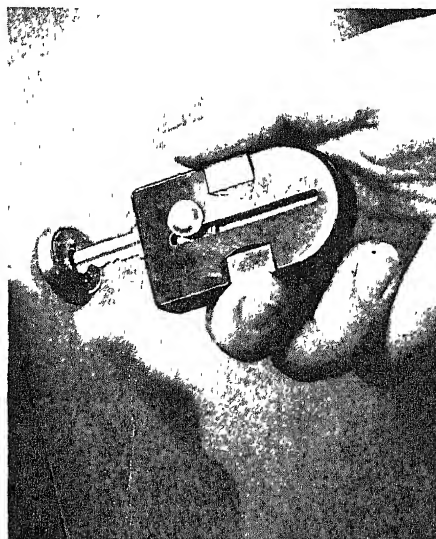
✿ **CARBURETOR** for liquid petroleum gas controls the proportion of air as well as gas intake from closed to full open position. The control of both eliminates the risk of dilution by liquid gasoline and carbon formation in the engine, it is claimed.

Science News Letter, February 7, 1948

✿ **LECTURE CAR**, Union Pacific Railroad, is a windowless motion picture theater seating 52 persons, for instructional meetings of railway employees and also for farmers' meetings. The movie screen can be raised and lowered by remote control from the projection booth at the rear.

Science News Letter, February 7, 1948

✿ **KEY CASE** holds two keys either of which can be ejected as shown in the picture by pushing one of the metal side buttons down a notch in the case. It holds the ejected key firmly for use



until it is snapped back into the housing by releasing the spring-actuated button.

Science News Letter, February 7, 1948

✿ **PHONOGRAPH RECORDS** for children are on light disks of especially processed paper covered with a plastic coating. It is said to be an excellent material for a sound surface, and as durable as the standard type of shellac records. Records include treasure tales and musical tales for youngsters.

Science News Letter, February 7, 1948

✿ **LIGHTING FIXTURES** for Navy fighting ships are made of plastic-glass and aluminum and will remain uninjured under severe shock from guns, shell and bomb explosions and other disturbances. They are also fire-resistant, and are made for either fluorescent or incandescent lamps.

Science News Letter, February 7, 1948

✿ **ROTATING ELECTRIC machine kit** is designed to make easy the job of teaching all types of electric motors. With it some 132 different types of operating machines can be built, and all parts and coils are visible at all times. The accompanying manual gives instructions for building the various types.

Science News Letter, February 7, 1948

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THE WEEKLY SUMMARY OF CURRENT SCIENCE • FEB. 14, 1948

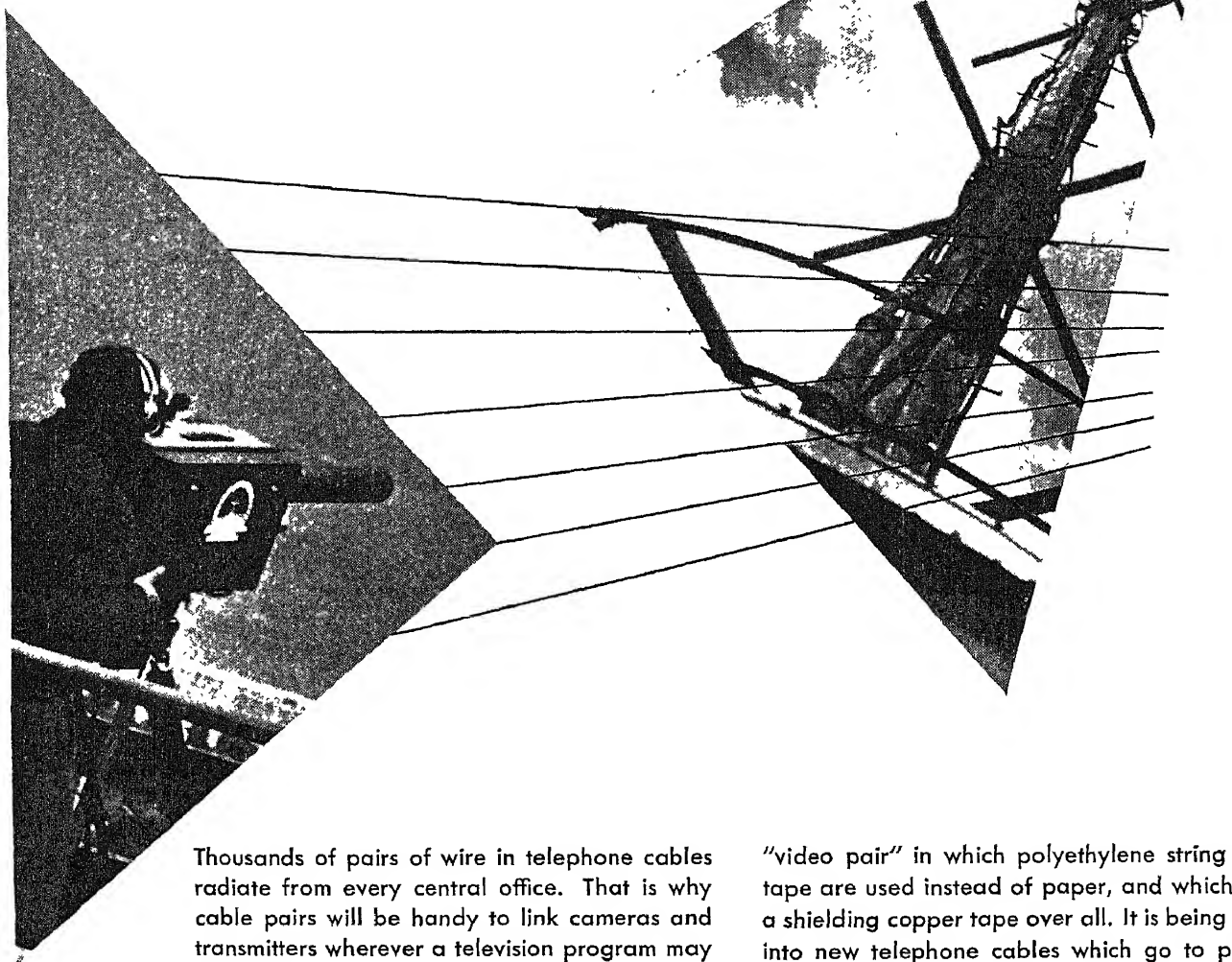


Long-Necked Immigrants

See Page 165

A SCIENCE SERVICE PUBLICATION

Television stations get programs by telephone lines, too



Thousands of pairs of wire in telephone cables radiate from every central office. That is why cable pairs will be handy to link cameras and transmitters wherever a television program may originate.

Since cable pairs are designed first for voice transmission—top frequency, about 3200 cycles per second—the loss at picture frequencies up to 4,000,000 cycles is high, so an amplifier is inserted about every mile. Equalizing networks are also needed to bring the losses at all frequencies to the same value.

Recently, the Laboratories have developed a

“video pair” in which polyethylene string and tape are used instead of paper, and which has a shielding copper tape over all. It is being built into new telephone cables which go to points where television programs are certain to originate. Losses are so much less that amplifiers can be four miles apart.

Inside an all-weather sheath, “video” travels safely and reliably alongside your telephone call, a sound program, telegraph signals, pictures for tomorrow’s papers. This service of the telephone cable was ready when television needed it because of Bell Laboratories activity.



BELL TELEPHONE LABORATORIES EXPLORING AND INVENTING,
DEVISING AND PERFECTING, FOR CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE

NUCLEAR PHYSICS

New Atomic Development

Suggestion that some day we may have a meson atomic bomb comes from the discovery that the most familiar kind of meson will produce fission of uranium.

➤ ENERGY may be blasted out of the atom by a lighter weight particle than the prime "trigger" of the atomic bomb, the neutron.

Scientists attending the American Physical Society meeting in New York were told of the promise of the meson, alias mesotron, in this respect. This fundamental particle of matter has not yet been artificially produced although it is generated by the powerful cosmic rays entering from outer space the earth's outer atmosphere with tremendous energies.

Dr. John A. Wheeler, the young Princeton University physicist specializing on the structure of the atom, has figured out that the most familiar sort of meson (there are probably four or five kinds of them) will produce fission of uranium. It is reasonably probable that it will split asunder the hearts of other heavy atoms with release of energy, that is, the turning of mass into energy, which is what happens in the fission of uranium or plutonium by neutrons (the process of the atomic bomb).

This is a very exciting idea and one that may be upsetting even to the international balance of atomic power. If and when the meson is created under control and aimed at materials that it can fission, it may be necessary to bring other elements than uranium and thorium under control of national and international atomic commissions.

Of course, we are a long way from a meson atomic bomb or atomic power plant. The experimental demonstration of meson fission has not yet been made. We are at an earlier stage in the possible realization of meson fission than the world was in 1939 when neutron fission of uranium was demonstrated in Germany.

The least that has happened on this new atomic frontier is that, as Dr. Wheeler says, "experimental and theoretical studies of the interaction of negatively charged mesons with atomic nuclei furnish another point of advance on the elementary particle problem."

What seems to happen is that mesons are able to move in orbits around the atomic nucleus which resemble the orbits of electrons in shape but are in

size 200 times smaller. The mesons jump from one of these orbits to another and release energy which should be able to initiate a special type of fission in uranium or heavier nuclei. If they can, the energy release figures out to be about half as much again as the energy given off by uranium that is fissioned by good old reliable neutrons.

A next step in the attempts at practical meson fission will be creation of mesons in new giant "atom-smashers", five of which capable of doing so should be in operation this year.

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AERONAUTICS

New British Helicopter Similar to Airplane

➤ A BRITISH helicopter, which has just made its first flight, looks more like an ordinary airplane than other craft of this type. The resemblance is due to a normal tail with twin rudders, and stub wings.

This Fairey Aviation company's craft has the ordinary overhead horizontally

rotating lifting blades, but it has also a conventional propeller at the tip of its starboard wing. This provides forward propulsion, and also counteracts the tendency of the craft to rotate caused by the main rotor.

It is an experimental model, capable of seating four persons. Advantages claimed for the design include greater safety than with ordinary helicopters, higher forward speed, and greater comfort.

Progress is reported on a freight-carrying helicopter which has three rotors. It will be capable of carrying 24 passengers or three tons of cargo. Claims are that it will be the fastest and most powerful helicopter yet built. It has a 1640 horsepower Rolls-Royce Merlin engine.

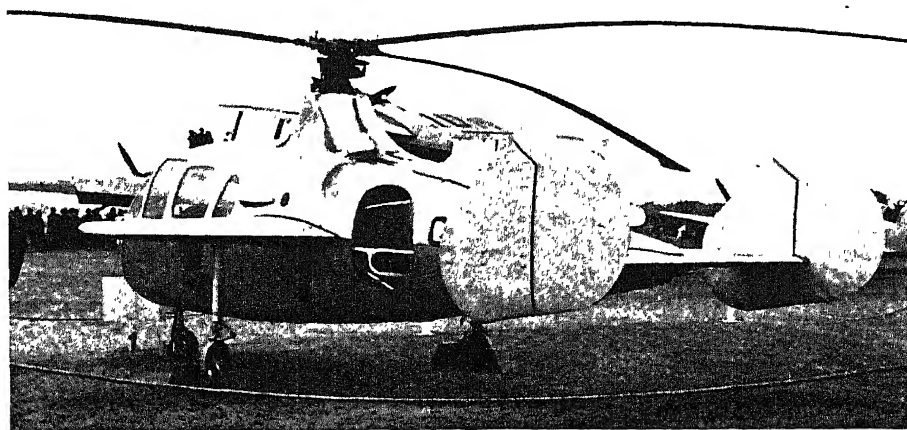
Science News Letter, February 14, 1948

MEDICINE

Alcohol Banishes Cancer In Mice—But Mice Die

➤ CANCERS in mice, of the type known as lymphosarcoma, have stopped growing and begun to disintegrate after injections with small amounts of 95% alcohol, in experiments reported by Dr. Allan D. Bass and Miss Marion L. H. Freeman of the Syracuse University College of Medicine.

The effect was discovered almost accidentally. The two researchers were injecting various drugs, dissolved in alcohol, into mice with malignant tumors. They found that destruction of the



RESEMBLES AIRPLANE—This British experimental helicopter looks like orthodox aircraft because it has a normal tail with twin rudders and stub wings. Advantages claimed for its unique design are greater safety, higher forward speed and greater comfort. It can seat four people including the pilot.

Linlithgow Library. the pilot.

Special Agricultural Research Institute.

11-11

growths was practically as great when alcohol alone was used.

The typical dose was a few drops (one-fiftieth of a cubic centimeter) of the 95% alcohol injected directly into the abdominal cavity. Weaker solutions, such as 19% alcohol, had no noticeable effect.

MEDICINE

Urge Examination of Hip

➤ EVERY baby should have its hip joints examined before the age of six months, Dr. Vernon L. Hart of Minneapolis declared at the meeting of the American Academy of Orthopedic Surgeons in Chicago.

Prevention of life-long deformity due to a dislocated hip is the reason he urges this examination.

"The only hope for cure of these patients, suffering from congenital dislocation of the hip, is early recognition and treatment during the age period of infancy before the infants begin walking," Dr. Hart said in his paper.

Three signs that may mean the baby's hip is dislocated are: 1. Extra skin folds of the thigh; 2. shortening of the distance from the pelvis to the knee; 3. limitation of the hip in spreading apart the knees when the hip is flexed.

If any one of these signs is present, the doctor should have an X-ray study made.

The normal socket of the hip joint, Dr. Hart explained, is "deep like a cup and provides a buttress and good stability for the head of the femur or thigh bone. If the socket develops abnormally and becomes flat and saucer-like instead of a deep cavity, then the buttress for the head of the femur is absent and displacement of the head of the femur from the socket may result. The displacement may be complete or incomplete.

"Complete displacement or dislocation may occur during intrauterine development (before birth); but more often the displacement remains incomplete, or a subluxation, until the infant is about

There is just one drawback, so far as possible applicability in human medicine is concerned—a high percentage of the treated mice died.

Technical presentation of the experimental results is given in *Science*, (Jan. 30).

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six months of age or until the time the child begins walking or weight bearing. Dislocation of the hip joint is always painless and the child begins walking about the usual time or a month or two later. At first the limp is very slight and is not recognized usually until some months later, when the dislocation has increased.

"Before walking begins the only malformation is the flat socket and the displacement which is a consequence of the shallow and flat socket. After walking begins many other changes take place in the bone and cartilage of the pelvis, socket, head, neck and shaft of the femur as well as changes in muscles, tendons, capsule and ligaments. These secondary changes develop very rapidly during the first several years of life and after a short time become a very serious obstacle to the treatment of the flat socket and dislocation or subluxation. After the age of about seven or eight years of life, the secondary changes are so serious and fixed and permanent that treatment for the dislocation becomes a very difficult problem.

"The hip joint displacement which is incomplete and which is called congenital subluxation of the hip may cause no limp, pain or disability until the patient reaches the age period of middle adult life—near 40 years of age. Disability is eventually caused by irritation over the years of a weight-bearing joint which was not entirely normal from the time of birth."

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CHEMISTRY

Find New Types of Gold

➤ MOST Californians are celebrating the one-hundredth anniversary of the discovery of gold which led to the famous gold rush. But a scientist at the University of California announced that he, too, has discovered gold—at least two new varieties of the element gold plus

one new type of platinum.

The new discoveries of precious metals will not set off a new gold rush. They were made with the atom-smashing 60-inch Crocker Laboratory cyclotron at the University. Chemical separations of bombarded metal targets in the atom-

smasher revealed new radioactive forms of the precious metals, Geoffrey Wilkinson reported in the *Physical Review*, (Feb. 1).

New varieties of gold are 39.5-hour gold and 4.7-hour gold. These forms of the valuable element give off radiation. The time figures are known as their half-lives, the period of time in which they lose half of their radioactivity. Another new precious metal is 3.0-day platinum.

The scientist also described new studies with other forms of the two precious metals, including 190-day gold, 15.8-hour gold, approximately one-day gold and 4.33 day platinum.

Science News Letter, February 14, 1948

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MEDICINE

Cure for Undulant Fever?

Hope that a combination of streptomycin and sulfadiazine may be completely effective against this disease was provided by nine recovered patients.

► THE combination of a sulfa drug and streptomycin, anti-germ chemical from an earth mold, may provide a cure for undulant fever, the disease that killed Edsel Ford, it appears from a report by four University of Minnesota medical scientists in the *Journal of the American Medical Association*, (Feb. 7). The scientists are Drs. Wesley W. Spink, Wendell H. Hall, James M. Shaffer and Abraham I. Braude.

Nine patients recovered from the disease completely when given both streptomycin and sulfadiazine, they report.

Neither drug alone, nor any other treatment, has given as good results, they state. But an even more effective weapon against the disease may come, they suggest, from the intensive investigations now being made of other drugs like penicillin and streptomycin.

The treatment was effective in both acute and chronic undulant fever. Particularly encouraging is the fact that it was effective in complications of the disease such as subacute bacterial endocarditis (a form of heart trouble) and the spinal disease, spondylitis.

The idea of using both drugs together came partly from tests the scientists were making on chick embryos and partly from experience with a patient who had improved when treated with streptomycin alone.

Toward the end of treatment and after the streptomycin was stopped, undulant fever germs in his blood were found to have developed resistance to streptomycin. The germs proved rather sensitive to sulfadiazine in laboratory tests, however, so the patient was given large doses of the sulfa drug. Whereupon his fever disappeared and there were no more undulant fever germs in his blood. Unfortunately, he had developed a severe heart inflammation and died suddenly of heart failure, although the germs that had caused the heart trouble had been eradicated.

The chick embryos had been used instead of guinea pigs to provide a faster way of screening possible remedies for undulant fever. Five sulfa drugs, penicillin and streptomycin were each tested. Although the sulfa drugs and strepto-

mycin each, when used alone, prolonged the lives of infected chick embryos, none of the remedies alone was very effective in killing the germs. But the combination of large doses of sulfadiazine with streptomycin did bring about 100% sterilization of the undulant-fever-infected chick embryos.

PHYSICS

Liquid Surfaces Measured

► THAT fine film which forms a liquid surface has measurable depth, scientists at the Stanford Research Institute declared. A million of these liquid surfaces, piled one on top of another, would give a depth of one inch, they claim.

To determine the depth of a liquid surface, they developed an instrument, as yet without a name, which measures the minute distortion of polarized light reflected off them. This depth is not a matter of purely scientific interest; it has a practical value in the fields of lubrication, oil exploration and biology, in fact wherever the reaction of liquid surfaces in contact with other materials is a factor.

The method of measuring the depth of a liquid surface was carried out by Stanford scientists working on a Naval Research contract under Dr. A. Paul Brady, research director, and the overall supervision of Dr. J. W. McBain, consultant on research. Two others who assisted were Dr. J. C. Henniker and Dr. Frank A. Lucy.

Classical mathematical theory assumed liquid surfaces had no depth. General scientific opinion for the past several decades thought the depth to be a billionth of an inch rather than the millionth now claimed. This belief was based on the assumption that attraction between molecules in the liquid was effective only over this very short range.

The work at Stanford is claimed to prove that molecular attraction takes place over a wider range than ever proved before. Dr. McBain explains the action by comparison with that of the ordinary magnet. It has a short direct

Undulant fever is also known as Malta fever and brucellosis. The germs are called *Brucella*, after Sir David Bruce, British medical officer who first discovered them. The disease attacks cattle, swine and goats and is responsible for heavy economic losses in livestock. Cattle owners in the United States lose more than \$50,000,000 annually, swine owners more than \$10,000,000 through this disease, it is estimated. Among humans there are believed to be 30,000 to 40,000 active cases annually.

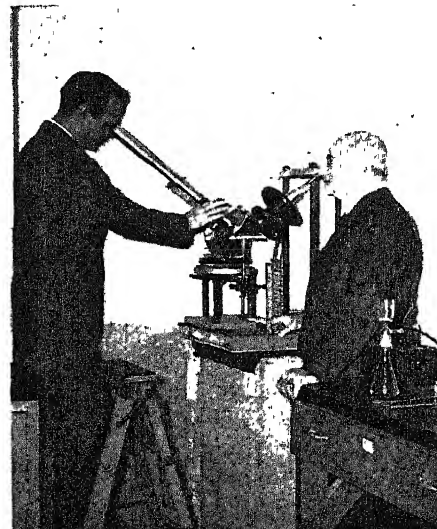
Humans get the disease through contact with infected animals, their secretions and carcasses, and from drinking raw milk from infected cows and goats.

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attraction on a cluster of nails, but can pick up a series of them, one hanging to another.

Molecules in a liquid surface, he believes, polarize several neighbors and these in turn polarize others. This chain-like relayed action extends over what he calls an "impressive distance."

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UPSET OF CLASSICAL THEORIES—Experiments shedding new light on the behavior of matter have resulted from the development of a new instrument, without a name as yet, which measures the minute distortion of polarized light reflected off liquid surfaces. Dr. A. Paul Brady is shown looking through this new instrument while Dr. J. W. McBain, research consultant, watches.

PHYSICS

Cosmic Ray Plateau Found

It is some 34 miles overhead. Instruments in a V-2 rocket were fired up to an altitude of 100 miles to determine the top of the atmosphere for cosmic rays.

➤ THE top of the earth's atmosphere for the cosmic rays that bombard us from outer space has been discovered by scientists who put their instruments into a captured Nazi V-2 rocket that was fired up to 100 miles over the White Sands, N. Mex., Proving Ground last July.

Some 34 miles over our heads, the intensity of the cosmic ray bombardment begins to become constant. This is the beginning of what scientists call the "cosmic ray plateau." From this high-altitude region out into space the cosmic radiation is believed to remain virtually constant.

Discovery of the start of the cosmic ray plateau was announced in the *Physical Review*, (Feb. 1), by Dr. J. A. Van Allen of the John Hopkins University Applied Physics Laboratory, Silver Spring, Md., and Dr. H. E. Tatel of the Carnegie Institution of Washington, formerly with the Applied Physics Laboratory.

They put a Geiger counter in the rocket fired at White Sands, July 29, last year. As the rocket shot up to an altitude of 100 miles, the scientists received a record of the cosmic ray count by means of a radio telemetering system. The rocket's flight gave them counts of cosmic rays at the highest

altitudes at which the mysterious rays have been studied.

Two important discoveries were made from records of the flight:

1. Start of the cosmic ray plateau is at about 34 miles altitude. From this height up to the peak of 100 miles, the cosmic ray count was nearly constant.

2. The intensity of cosmic rays in the space out from the earth is two to three times greater than scientists had calculated on the basis of lower altitude observations.

Below 55 kilometers, or approximately 34 miles, the cosmic rays varied from one or two counts a second at sea level to a peak of 49 counts per second in the neighborhood of 12 miles above the earth. But for the highest 66 miles of the flight, the cosmic ray count was steadily a little more than 22 counts per second.

It is believed that this intensity of cosmic rays extends out into space until the still-unknown source of the radiation is approached.

Dr. Van Allen has left for White Sands to make arrangements for another rocket flight scheduled Feb. 19. This flight, if successful, will give the scientists more information about these new discoveries.

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GEOLOGY

Find Mineral Deposits

➤ AMERICA'S minerals, of the kinds we have, will last longer than some predict, due to new discoveries by government and other agencies, the Secretary of the Interior, J. A. Krug, indicates in his annual report. There are, of course, essential minerals not found within the United States.

Old-time prospecting for minerals is out. Surface deposits, most of them, have been found and many exhausted. Below the surface, according to Dr. W. E. Wrather, director of the Geological Survey, lie enormous volumes of rock which contain concentrations of useful minerals which in many instances are as abundant as those closer to the surface.

Modern scientific explorations, car-

ried out by geologists, geophysicists and geochemists must be used to discover this hidden wealth. The Survey, he states, has developed highly refined techniques in its program of exploration and appraisal of deeply buried ores. They are already in use.

Additions to the nation's mineral reserves are reported by the U. S. Bureau of Mines. They include copper, iron, and lead-zinc ores, not in large amounts but sufficient to produce commercial metals. One deposit contains 21,000,000 tons of black sand composed of 54% titanium, 15% zircon, 14% staurolite, and other minerals. This is important with titanium oxide now becoming a principal pigment in white paints and the wider uses of

zirconium in electrical and chemical porcelain and in metals and alloys. A new mica deposit and a barium sulfate deposit are also reported.

Important activities of the Bureau of Mines are concerned with the development of processes to recover metals from low-grade ores which must be increasingly used as the better grades are exhausted, or to make America independent of imports. The developed processes accomplish purification largely by electricity. They include electrolytic cobalt and the extended use of electrolytic manganese and chromium in ferroalloys.

Fuel oil from oil shale was a major accomplishment of the Bureau of Mines during the year. A pilot plant at Rifle, Colo., is now producing 100 barrels a day, and new laboratory facilities have been completed at Laramie, Wyo. From work at both, oil shale promises relief from future shortages such as now exist. Progress also is reported in making fuel oils from coal and lignite.

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MEDICINE

Suggest Figuring Age After 40 Biologically

➤ A NEW way to tell how old a person is after he has passed his fortieth birthday has been worked out by Dr. Harry Benjamin of New York City. Instead of counting birthdays, you count up the age of various organs and organ systems of the body, taking into account also heredity, living and dietary habits and personal history of illnesses, accidents and the like.

By this method of determining age, a man of 70 years may be found to have a biologic age, as Dr. Benjamin calls it, of 55 years. Then, since he has the life expectancy of a man of 55, which for a white American is 18 years, the 70-year-old has a good chance of living to "the ripe old age of 88." This gives him a life expectancy of nine years more than he would have from figuring his life expectancy on his calendar age of 70.

A nice part about this way of figuring age is that it gives a person a chance to make himself younger. The example Dr. Benjamin gives of this is someone who is not dangerously ill or disabled, yet not well enough to be considered in average good health. The favorable points in such a person's health might make him 10 years younger than the calendar says he is. But the bad points would make him about 15 years older. The two cannot be balanced off against each other, but the bad points might be improved,

and the age thereby lowered, by treatment and other measures.

To get your biologic age you will have to pay a visit to your doctor. After he has examined you, he can estimate the age of your heart and blood vessels, your nervous system, your mental functions, your digestive system, skin, eyes, ears and other of the 20 items in Dr. Benja-

min's health inventory. Your heart and blood vessel system could change your calendar age by five to 30 years. Heredity, living habits and nervous system could modify it by five to 20 years. Skin, eyes and ears would modify it by only five to 10 years. Details on estimating biologic age appeared in the *Journal of Gerontology*.

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MEDICINE

Check Resistance in Germs

Penicillin sensitivity is restored to resistant disease germs by briefly associating them with germs of another family such as streptococci.

► THE frightening idea that penicillin will become useless as a remedy in a few years because the disease germs it now checks will all have developed resistance to its action is somewhat dispelled by a discovery of Dr. A. Voureka, British Council Research Scholar working in the Wright-Fleming Institute at St. Mary's Hospital, London, where penicillin was discovered.

Germs that have developed resistance to the famous mold remedy can be made sensitive to it again in a few minutes. All that is necessary is for the resistant germs to associate briefly with germs of another family. Resistant staphylococcus germs, for example, were made sensitive by associating with streptococci or with diphtheria, typhoid and pneumonia germs.

Dr. Voureka started with the idea that sensitivity to penicillin might depend on some chemical or physical factor. In that case, resistant germs, he reasoned, might be able to borrow some of the factor from sensitive germs. So he grew resistant and sensitive germs together. The resistant ones duly became sensitive.

Then he found he could achieve the same result by letting the two kinds of germs stay together for five minutes. Mere association in the same tube was enough. It did not matter about temperature, either. Resistant germs acquired sensitivity in the refrigerator, the incubator or at room temperature. They even acquired it from germs which themselves were resistant to penicillin, and from substances produced when other germs were destroyed by bacteriophage.

The penicillin-sensitivity restored to germs that had grown resistant lasts a long time.

The work is still preliminary and so

far only seven out of 20 strains of germs tested have had their penicillin resistance reversed. Dr. Voureka does not say, in his report to the *Lancet*, (Jan. 10), British medical journal, how his discovery will be applied in the case of a patient for whom penicillin has become useless because his germs have developed resistance to the mold chemical. But, he points out, germs often grow in association with other germs in the human body. And he believes that the idea that

all strains of staphylococci will become resistant to penicillin in the near future "must be reconsidered."

Science News Letter, February 14, 1948

PLANT PATHOLOGY

One Moldy Lemon Ripens 500 Others Too Soon

► THE old adage about one rotten apple spoiling the whole barrel holds true, in modified form, for lemons. One thoroughly green-moldy lemon can cause 500 others to ripen before they are wanted—which is equivalent to spoiling them.

Lemons are commonly kept in storage for five or six months before ripening, states Dr. Jacob B. Biale, University of California horticulturist, but if one of them becomes infested with green-mold fungus it will produce enough ethylene gas to speed the ripening and yellowing of the sound fruit to as short a period as ten days.

To prevent molding, Dr. Biale recommends storage at lower temperatures, also under an atmosphere containing only 5% of oxygen instead of the 21% present in ordinary air.

Science News Letter, February 14, 1948



GIANT TUBER—This root of a perennial wild cucumber dug up on the campus of Occidental College, Los Angeles, Calif., is 27 inches tall, 36 inches in diameter, 74 inches in circumference and weighs about 200 pounds. Dr. Frank J. Smiley, botany professor at the college, estimates that it is at least 20 years old. Not only is it unusual in size but shape also, for the usual wild cucumber root looks like a turnip.

VETERINARY MEDICINE

Plans for Long Siege on Cattle Disease Being Made

➤ **LEADERS** in the American forces of scientists conducting the defense against foot-and-mouth disease already have provisional plans ready for their campaigns, in case the bill approved by the Senate agriculture committee is enacted. Defeated in their hopes for ending the danger by a quick, sharp mop-up of the infected area in Mexico, they now expect a long, tenacious, step-by-step siege.

Among the objects of research will be the various vaccines now used in Europe and other lands where the disease has long been entrenched. Some of these seem promising; though American workers have been reluctant to consider using vaccine defense as long as there was a chance to wipe out the Mexican infection and thus spare American stock-raisers and farmers the expense and trouble of buying and administering a vaccine.

Better and more scientific methods for clean-up and sanitation of infected premises will also be sought by the researchers. Up to now, emergency methods were employed that were known to be effective, with little regard to cost. Since we are going to have this thing to fight for years, probably, it seems advisable to refine methods and try for equal or greater efficiency at lower cost.

Science News Letter, February 14, 1948

VETERINARY MEDICINE

Red Squill Rat Poison Can Harm Other Animals

➤ **RED SQUILL**, widely recommended as a "safe" rat poison, non-toxic to other animals, is not as safe as commonly believed, declares Dr. Albert C. Nagle, veterinary physician of San Antonio.

Recently a valuable collie was brought to him, after it had been sick for three days. Only the most heroic treatment sufficed to save the animal's life.

When Dr. Nagle checked back on the history of the trouble, the owner at first could not recall seeing his dog eating anything that might have brought on the attack. Then he remembered that the dog had eaten a quantity of red squill wafers he had been using against rats, but because he had been told that red squill could poison only rats he had paid no further attention to the matter.

Because red squill in small quantities will cause vomiting, the poison usually

serves as its own antidote in case of accidental swallowing. Since rats cannot vomit, the drug is effective against them. But this and other cases demonstrate that it can be poisonous to other animals if taken in sufficient quantity.

Dr. Nagle recommends, in a communication to the American Veterinary Medical Association, that a statement to this effect be added to the labels on commercial preparations of red squill intended for rat-killing purposes.

Science News Letter, February 14, 1948

NUTRITION

Appetite Is Poor Guide For Best Nourishment

➤ **THE** idea that you can rely on your natural appetite to guide you to the foods you need for best nourishment is not borne out by latest scientific studies, states Dr. Charles Glen King, scientific director of the Nutrition Foundation in New York.

Under controlled conditions, white rats have been shown to possess an ability to select certain minerals and vitamins on the basis of critical need. But their appetite guidance in that respect is not fool-proof. And when it comes to protein food, such as we get from meat, eggs, fish and milk, the animals' appetite may be way off as a guide.

Animals in a test by Dr. E. M. Scott at the University of Pittsburgh showed such gross lack of ability to select essential protein that they were at the point of starving from lack of protein even when the needed protein was in food cups beside them.

The animals also showed marked variation in ability to make proper selection of foods, even when genetic and environmental conditions were highly standardized. Rat A might select a pretty fair diet for himself but his brother from the same litter and living under the same conditions would fare badly.

"If a highly standardized animal, under laboratory conditions, has only a faulty guidance by spontaneous appetite," Dr. King points out, "it seems far less likely that human guidance would be adequate under the highly artificial and varied circumstances that surround the selection of foods in daily life."

"This does not mean, of course," he added, "that consideration of appetite can or should be disregarded. But the new evidence does reemphasize the necessity of providing for sound educational measures."

Science News Letter, February 14, 1948

IN SCIENCE

MEDICINE

Nerves to Hip Joint Cut To Relieve Arthritic Pain

➤ **RELIEF** from pain caused by chronic arthritis of the hip is possible for aged patients who are not strong enough to undergo regular surgery, doctors were told at the Chicago meeting of the American Academy of Orthopedic Surgeons.

This merciful measure results from cutting the major nerves to the hip joint, explained Dr. Benjamin E. Oblatz of Buffalo, N. Y.

The operation can be done on patients of any age for it involves a rather simple procedure, does not produce shock and enables the patient to walk the next day and leave the hospital in one week.

Forty-two patients on the average over 60 years old have received this new surgical treatment since May of 1946 and of these 28 have obtained some degree of relief from pain, Dr. Oblatz stated. While in 14 no beneficial results were noted, there were no complications or ill effects in any of these patients.

This new type of operation was first reported by a Dr. Tavernier of Lyons, France.

Science News Letter, February 14, 1948

MEDICINE

Sulfa Tablets Should Be Crushed for Children

➤ **WHEN** you give a sulfa drug tablet to a young child, be sure the tablet is crushed and moistened with water, warns Dr. C. L. Heald of Sigourney, Iowa, in the *Journal of the American Medical Association* (Jan. 31).

The death of a two and one-half year old child prompted his warning. The child died of suffocation caused by half a sulfadiazine tablet prescribed by a physician. The tablet had stuck in her larynx when she tried to swallow it and although Dr. Heald rapidly cut an opening into her throat and removed the pieces of tablet it was too late.

Physicians should, Dr. Heald states, instruct parents on how to give these tablets safely or else prescribe one of the sugar lozenges or pleasant-tasting liquid sulfa drug preparations now available.

Science News Letter, February 14, 1948

THE FIELDS

GENERAL SCIENCE

Immigrant Animals Are Quarantined at Athenia

See Front Cover

➤ ANIMALS being brought into the U. S. from abroad, such as the African giraffes shown on the cover of this week's SCIENCE NEWS LETTER, are quarantined at Athenia, N. J., the Department of Agriculture's "Ellis Island for animals." This quarantine helps keep dangerous diseases of both animals and man from being brought into the country by animals from abroad. Built in 1900, the Athenia station covers 52 acres with accommodations for 600 cattle or animals of comparable size.

The four-legged aliens get a thorough checkup from veterinarians, looking for such plagues as foot-and-mouth disease. If the animals are found to be healthy, they are sent on to their destination in this country. Animals with disease or suspected of carrying infections are either slaughtered at the Athenia station or shipped back to their native land.

Science News Letter, February 14, 1948

GENERAL SCIENCE

High School Student Builds "Glass Heart"

➤ BUILDING a "glass heart" for keeping animal organs alive for prolonged periods is the difficult feat accomplished by Lawrence J. Schaad, 17-year-old senior in Logan High School, Logan, Ohio. He got the idea from the famous device built some years ago by Col. Charles Lindbergh and the late Dr. Alexis Carrel, but his device is an improvement over theirs in at least one respect; it can be assembled out of stock laboratory materials such as flasks, U-tubes, ordinary glass tubing and stopcocks, and requires no special skill in glassblowing to construct.

The first model he built, Mr. Schaad states, was a failure, partly because the specimen to be kept alive could not be introduced easily, also because there was no way of keeping out trouble-making bacteria. In his improved apparatus he has overcome these difficulties. Since it is not practicable to sterilize the machine under steam pressure, he clears it of bacteria by flooding it with alcohol, then

drying it with a current of filtered air.

His first test operation was with the heart of a frog. By the time he could get this small, hard-to-handle organ properly mounted it had stopped beating. However, it began again, and after two and one-half hours it was still beating as strongly as ever. It lived for several hours more.

Mr. Schaad sees research possibilities in the use of his device: "To me this seems to be an excellent way to study the action of living tissues because they are readily observable at all times. Possibly this method will prove useful in studying cancer and viruses, since affected tissues could be observed under controlled conditions. It might also be used in the isolation of tissue secretions."

Mr. Schaad is a winner in the Seventh Annual Science Talent Search, and will go to Washington, D. C., at the end of this month, for the finals of the competition for \$11,000 in Westinghouse Science Scholarships. There he will meet with the 39 other finalists, attending the Science Talent Institute, to be held Feb. 27 through March 2.

Science News Letter, February 14, 1948

GENERAL SCIENCE

Bars on Cages Replaced With Shatterproof Glass

➤ SHATTERPROOF glass like that used on wartime airplanes has replaced bars in some of the cages in Chicago's Zoological Park. So strong is it that when several powerful great apes attacked it vehemently, immediately after its installation, they were completely baffled. Some of them continue stubbornly to hammer at it, but all they get is exercise.

The glass is of a familiar sandwich construction, consisting of two quarter-inch sheets of plate glass on the outside with a layer of tough plastic between them. Glass fronts on cages in reptile houses have previously been in use, but these consist of one thickness of plate glass only, and would not be safe for use in confining more aggressive animals like chimpanzees and orang-utans.

There are mutual advantages for animals and spectators in this more complete separation. Visitors can no longer toss peanuts, in violation of the rules, and poke through the bars at animals with umbrellas and canes. On the other hand, mischievous or malicious apes are no longer able to reach out and grab the hair or necktie of an unsuspecting visitor getting too close to the cage.

Science News Letter, February 14, 1948

ENTOMOLOGY

Ants Recognize Friends; Strangers Get Bum's Rush

➤ ANTS readily identify their friends; they also quickly recognize strangers that get into their colonies and unceremoniously throw them out, reports a youthful Fabre who is a senior at the Bronx High School of Science in New York. He is Kurt W. Kohn, 17 years old last September. At night, when his ants are asleep, he takes startrail photographs with a small telescope.

Immediate contact between individuals is necessary for recognition among ants, he states; either scent or touch seems to serve as means of identification. One stranger ant which he dropped into a colony of a different species was attacked by every ant she met but ignored by all the others, even though they sometimes missed contact by only a small fraction of an inch.

Mr. Kohn built an observation nest for better observation of his ants. The insects were penned between two eight-inch squares of glass, in an eighth-inch layer of soil. The whole nest was placed on a block of wood, with a water moat around it to keep the ants from straying.

Certain scents can disguise friends so that they are treated as strangers, he states. He scented up several ants with formic acid, the chemical-warfare agent the ants often use in their combats, and returned them to their nest. They were immediately thrown out, in exactly the same manner as were stranger ants that had been touched up with the same scent. Ants drowned in water, which presumably washed away their formic acid, were ignored by active worker insects. When other ants were stupefied with carbon tetrachloride vapor, which does not dissolve formic acid, the colony's judgment was better, though still not inerrant. They carried three unconscious friends into the nest and threw two out; at the same time they threw out four strangers but carried one into the nest. Apparently they discovered their mistake after a while, for they brought her out again and threw her away.

Mr. Kohn has also found evidence that the recognition-scent is hereditary; for when several ants reared from the pupal stage by stranger nurses were returned to their parent colony they were at once accepted, while their nurses were not.

Mr. Kohn is one of 40 high school seniors from all over the country who are winners in the Seventh Annual Science Talent Search.

Science News Letter, February 14, 1948

ASTRONOMY

Reforms in Our Calendar

Various changes are made from time to time to correlate the months with the seasons. The year is longer than 365 days, less than 366, so Leap Year was instituted.

By MARTHA G. MORROW

➤ THAT extra day the calendar-makers give us once every four years, the bonus of a Feb. 29, this year will come on Sunday. Four years from now brazen young ladies are supposed to "have their day" on Friday, Feb. 29. And in 2100, although divisible by four, there just won't be any Leap Year Day at all.

These various changes in our more or less orderly calendar are made to keep our months eternally at the right season of the year. The system of adding an extra day every fourth year was adopted about 2000 years ago, that of omitting the extra day three out of every four times that a century ends was inaugurated less than 400 years ago.

The calendar of all western nations has been borrowed from the Romans. Their month, based upon the periodic repetitions of the phases of the moon, was about the same length as the lunar month—29 or 30 days. To keep the months in order, they were forced frequently to insert an extra month. A more orderly calendar was definitely needed.

Julius Caesar

Upon the advice of the Alexandrian astronomer Sosigenes, Julius Caesar adopted $365\frac{1}{4}$ days as the true length of the year and ordained that every fourth year should contain 366 days. The tropical year, however, is 11 minutes, 14 seconds shorter than this, so in the course of 1000 years the Julian calendar becomes nearly eight days too long.

In time the vernal equinox had become earlier and earlier. By 1582 it fell on March 11 instead of occurring on March 21, as it did at the Council of Nicaea in 325 A. D. Pope Gregory XIII, therefore, upon the advice of the astronomer Clavius, ordered the calendar corrected by dropping ten days.

In Catholic countries, where the Gregorian calendar was adopted earlier than in the other Christian countries, the day following Oct. 4, 1582, was called the fifteenth instead of the fifth.

To avoid further displacement of the beginning of spring, Gregory decreed

that the rule of adding an extra day every fourth year should be followed except in the case of those century years whose number is not divisible by 400. Thus 2000 A. D. will be a leap year, but 2100 will not, nor was 1900.

Eleven days had to be dropped by England and her colonies—including America—to bring the calendar in line when the new type calendar was adopted in 1752, almost 200 years after it came into use in some European countries. Since 1800 and 1900 were not leap years in the Gregorian calendar, at present that and the Julian calendar differ by 13 days.

Tropical Year

The tropical year actually consists of 365 days, five hours, 48 minutes and 46 seconds. The Gregorian year is thus about 26 seconds too long. But calendar experts won't have to worry for a few thousand years about an error amounting to one day.

The Egyptians, who had calculated as 365 days the time it takes the earth to circulate around the sun (the solar year), divided the year into 12 equal months each of 30 days, the remaining five days being devoted to festival holidays. Their weeks, however, were ten days long.

Nor did the calendar instituted by Caesar include any seven-day week. This was an eastern invention, used by the Babylonians and later by the Jews. Not until the fourth century was the week established in Christendom and Sunday proclaimed as the day of worship.

Both the Julian and the Gregorian calendars have months of irregular length. This also can be traced back to the time of the Caesars.

In reforming the calendar, Julius Caesar established the simple system by which the months, beginning with March, should have 31 days, alternating with months of 30 days, except the last month, February. This was to have 30 days in leap years only and 29 days in normal years.

But this reasonable rule was not long followed. The sixth month, Sextilis, was named after his successor, Augustus.

The story goes that to make this month of August as long as that of July, named after the first Caesar, Augustus stole another day from February. Then to avoid having three consecutive months of 31 days each, he rescrumbled the calendar a little more.

Proposed Changes

A number of reform calendars have been devised throughout the last century to correct such difficulties in our present calendar as:

1. Unequal quarters. One three-month period consists of 90 days, another of 92 days.

2. Unequal months. In normal years February has 28 days, whereas seven of the months are given 31 days each.

3. Indivisibility of months into weeks. At present each month consists of four weeks plus an odd number of days.

Several calendars have been sponsored during the present century, the idea being one should be adopted simultaneously by nearly all of the nations. Outstanding among these are a 13-month calendar and an equal-quarter calendar. Sponsors of these international calendars agree that the year should begin on Sunday, and each introduce an



FOUNDER OF OUR CALENDAR
—Pope Gregory XIII gave his name to the Gregorian calendar which we use when in 1582 he ordered 10 days dropped from the Julian calendar to correct a discrepancy.



LEAP YEAR—The extra day which comes on Feb. 29 was established to match more nearly the time it takes the earth to revolve around the sun. Pope Gregory initiated the rule of adding a day every four years except in the case of those century years whose number is not divisible by 400.

extra day each year—two in leap years—that is a true holiday and belongs to no day of the week. They both follow the Gregorian rule governing leap years.

Under both of these plans the same day of the year would always fall on the same day of the week. Thus New Year's Day, Fourth of July and other holidays would always come on the same day as well as the same date. This would avoid the uncertainty that is eternally arising concerning holidays. For instance, do workers get Friday off when Christmas falls on Saturday or Thursday?

Thirteen identical months of four weeks each are proposed in the International Fixed Calendar. In this method of reckoning days, each month begins on Sunday. The twenty-fourth of each month would always be a Tuesday and there is a Friday the thirteenth in every month.

13 Business Months

A number of businesses in the United States and Canada have actually tried operating on the 13 business months of four weeks each. International acceptance would be necessary, however, before such individual adoption could be given a fair trial.

The year of 12 months is divided into four equal parts by the World Calendar, which introduces certain reforms into the Gregorian calendar we use today. Each quarter consists of three

months with a total of 91 days each. The calendar proposed by this organization, the most active today, has gained wide acceptance.

January, April, July and October, the first month in each quarter, always begin on Sunday and have 31 days. The other months of each quarter consist of 30 days. The second month of each quarter always begins on Wednesday; March, June, September and December start on Friday.

Year-End World Holiday

An additional day is inserted at the end of December and called Year-End World Holiday. The extra day introduced each leap year would appropriately be tagged onto the end of June, the month of brides.

Sponsors of the World Calendar have selected a date less than two years off as ideal for its international adoption. Jan. 1, 1950, was picked because both the present and the new calendars come together at that date, both years beginning on Sunday. Transition from the old to the new could be made much more smoothly than when the Gregorian calendar was adopted and people were cheated out of 10 to 13 days.

The difficulty of fixing the date of Easter is also avoided. This being an ecclesiastical matter, they leave that to the Church to determine.

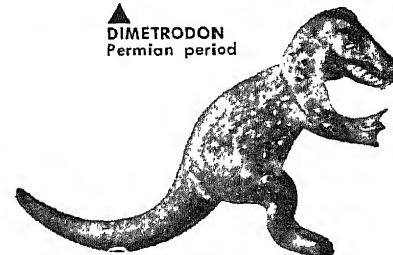
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PREHISTORIC ANIMALS

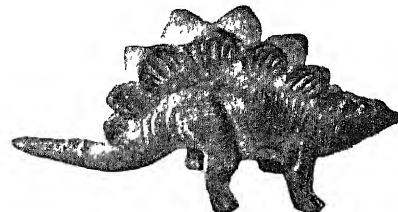
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Racing boats, with hydrofoils under their hulls that lift them well out of the water when traveling fast, are capable of great speed; the hydrofoils are wing-like parts that project downward and backward.

America has *submarines* that can stay under water for weeks by use of the German "schnorkel" breathing tube; an attempt now is being made to generate oxygen from hydrogen peroxide so that the breathing tube will not be needed.

Printing and dry cleaning plants are decreasing operating costs by salvaging solvent vapors that have escaped into the air by the use of activated *carbon*; they are recovered by passing the plant air through the carbon which absorbs the vapors.

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NUTRITION

Butter Versus Margarine

Height and weight gains and general health of children found about the same in two-year study, whether margarine or butter is table fat.

➤ CHILDREN grow as well on margarine as on butter, Drs. Harry Leichter, George Eisenberg and Anton J. Carlson of Chicago report in the *Journal of the American Medical Association* (Feb. 7).

The report, from the University of Illinois College of Medicine department of pediatrics, is of a study aided by a grant from the National Association of Margarine Manufacturers. Terms of the grant provided that findings of the study could be published regardless of results.

Unlike most studies of the relative merits of butter and margarine, human children instead of laboratory rats were the subjects.

The children ranged in age from three to 17 years and were orphans or half-orphans living in two different institutions. Those in one institution got only margarine, from vegetable fats and fortified with vitamin A, to spread on bread, and as the fat used on vegetables, in pastry and for frying. Butter was the only fat used for these purposes in the other institution.

The study went on for two years, during which time more than 200 records were accumulated. These included reports on children's health, monthly height and weight records, and red blood cell counts and hemoglobin determinations made at the beginning of the study and again one year later. Because some children stayed in the institutions a short time, all records for those studied less than six months were discarded. This left 160 records in the margarine group and 107 in the butter group.

At the end of two years, the average yearly gain in weight for boys getting margarine was 6.7 pounds, while that for boys getting butter was 8.1 pounds. The difference is not statistically significant, the scientists point out. Girls on margarine had a yearly average gain of 8.2 pounds, those on butter 6.3 pounds.

Yearly average gain in height for boys on margarine was 2.2 inches, for those on butter it was 1.6 inches. The figures for girls were 2.2 on margarine, 0.9 on butter.

The health of the children was "uni-

formly good so far as serious illness is concerned, regardless of whether margarine or butter was the source of the greater part of the fat in the diet," the scientists report.

"If there is a growth factor present in butter which is not present in margarine, there is no evidence in the present study that such a factor plays any important part in the growth of children as determined by increases in height and weight," they state.

"Margarine is a good source of table fat in growing children, as determined by a two-year study. Children readily accept margarine as a table spread when it is colored and served in pats."

Science News Letter, February 14, 1948

GENERAL SCIENCE

Scholarship Offered for Teachers of Lip Reading

➤ A NEW kind of scholarship is being offered to prospective teachers of lip reading by the American Hearing Society, trustee of the Kenfield Memorial Fund.

Honoring Miss Coralie N. Kenfield of San Francisco, the scholarship provides \$100 for a normal training course at any institution acceptable to the Teachers' Committee of the American Hearing Society.

Applicants must have ability to read lips, have personal characteristics necessary for successful teaching and meet certain educational requirements.

Science News Letter, February 14, 1948

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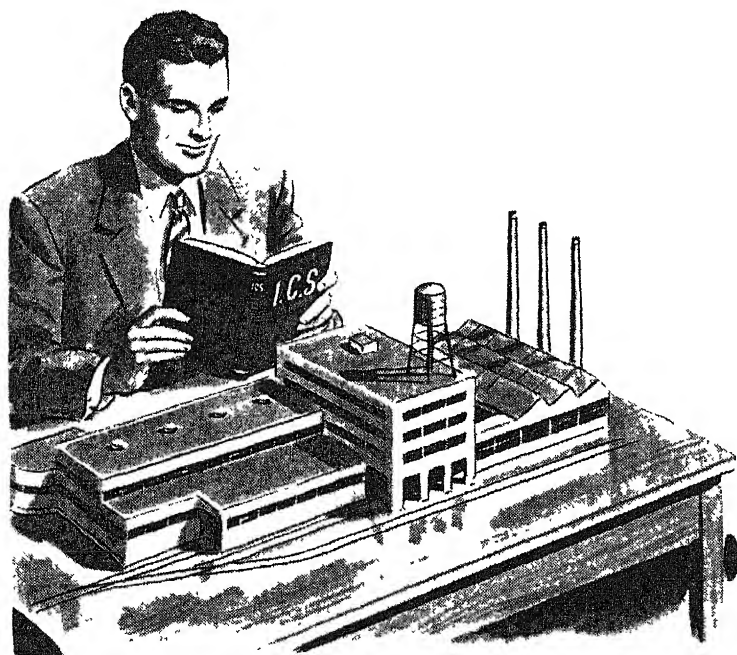
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<input type="checkbox"/> Diesel-Electric
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Mechanical Courses
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<input type="checkbox"/> Aircraft Drafting
<input type="checkbox"/> Flight Engineer
<input type="checkbox"/> Forging <input type="checkbox"/> Foundry Work
<input type="checkbox"/> Heat Treatment of Metals
<input type="checkbox"/> Industrial Engineering
<input type="checkbox"/> Industrial Metallurgy
<input type="checkbox"/> Machine Shop
<input type="checkbox"/> Machine Shop Insp.
<input type="checkbox"/> Mechanical Drafting
<input type="checkbox"/> Mechanical Engineering
<input type="checkbox"/> Mold-Loft Work
<input type="checkbox"/> Patternmaking—Wood, Metal
<input type="checkbox"/> Reading Shop Blueprints
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<input type="checkbox"/> Sheet-Metal Worker | <input type="checkbox"/> Ship Drafting
<input type="checkbox"/> Ship Fitting
<input type="checkbox"/> Tool Designing
<input type="checkbox"/> Toolmaking
<input type="checkbox"/> Welding—Gas and Elec.

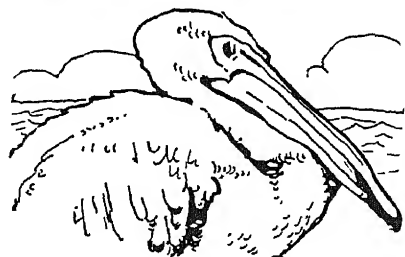
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Pelican Myths

➤ PELICANS are familiar sights to winter vacationers in warmer parts of the country. They are amusing to watch as they strut pompously on the shore, reminding one irresistibly of a certain type of statesman slightly overdoing his dignity. Afloat or in the air, however, they are more in their element; for heavy birds they are good fliers, and of course they are first-class swimmers.

There are two things rather widely believed about pelicans, one dating back into antiquity, the other of more recent vintage, but both equally false.

Quite generally accepted during ancient and medieval times, and lingering still in the minds of some persons, is the belief that the mother pelican pierces her own breast with the sharp hook on the end of her beak, and lets her young drink her blood. This pious legend of parental self-sacrifice found its way into much early religious art, and is still perpetuated on the coat-of-arms of the State of

Louisiana. It seems to be based on two pelican habits; the feeding of the young by permitting them to thrust their heads and necks into the parent's beak, to feed on fish regurgitated from the crop; and the pelican's way of resting its wet beak-end on its breast, sometimes leaving a patch of darkened feathers.

The more modern pelican-myth is based on the big chamois-skin-like pouch under the bird's long beak. Its remarkable capacity has been celebrated in a slightly profane limerick that presumably everybody has heard. But the pelican's pouch will not store a week's rations, or even a day's. The pelican uses

it as a fishing-net, not as a storage-place. He can gulp down amazing quantities of fish, but they go to his crop and his stomach.

Pelicans in more northern areas are as a rule seen only in summer; the birds migrate southward in the winter. Perhaps the most famous of such pelican summer colonies is the one that nests on a couple of tiny islands in Yellowstone Lake, and add to the region's picturesqueness for the benefit of park tourists. These birds are said to fly all the way to the Gulf of California for their winter fishing.

Science News Letter, February 14, 1948

• Books of the Week •

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THE BIOLOGY OF MELANOMAS—Myron Gordon and others—*New York Academy of Sciences*, 466 p., illus., \$5.00. Results of a conference on the biology of normal and atypical pigment cell growth.

CHEMICAL CALCULATIONS—Bernard Jaffe—*World Book*, rev. ed., 180 p., illus., \$1.60. For high school students.

CONTRIBUTIONS TO THE STUDY OF TUBERCULOSIS—Research Department, *National Jewish Hospital at Denver*, 378 p., illus., paper, free to medical libraries and chest specialists from National Jewish Hospital at Denver, 3800 East Colfax Ave., Denver 6, Colo.

COOPERATION IN THE AMERICAS—Interdepartmental Committee on Scientific and Cultural Cooperation—*Govt. Printing Office*, 146 p., illus., paper, 40 cents. Department of State publication 2971. An account of what is being done to improve inter-American cultural relations, including the story of the book translation program in which Science Service participates.

EPILEPSY: Psychiatric Aspects of Convulsive Disorders—Paul H. Hoch and Robert P. Knight, Eds.—*Grune and Stratton*, 214 p., illus., \$4.00. Written by experts, this book stresses the clinical approach rather than research activities and gives attention to the psychiatric as well as the medical needs of the patient.

FLOWERS OF PRAIRIE AND WOODLAND—Edith S. Clements—*Wilson*, 83 p., illus., \$2.25. Flower lovers will enjoy this little book, beautifully illustrated in color.

GRAND COULEE: From Hell to Breakfast—Fred O. Jones—*Binford & Mort*, 64 p., illus., \$2.00. The story of a great dam done mostly in photographs and drawings. The author was formerly geologist for the U. S. Bureau of Reclamation.

HANDBOOK OF CHILD GUIDANCE—Ernest Harms, ed.—*Child Care Publications*, 751 p., \$8.60. Contributions from specialists on guidance for the normal child, the physically handicapped, and problem and subnormal children, with chapters on child guidance training and social and religious aspects.

LIBERIA—Charles Morrow Wilson—*William*

Sloane Associates, 226 p., illus., \$3.75. An interesting description of a little-known part of the world.

MAGIC SHADOWS: The Story of the Origin of Motion Pictures—Martin Quigley, Jr.—*Georgetown Univ. Press*, 191 p., illus., \$3.50. The romantic story of all the early beginnings dating back to 5000 B. C. and the ancient Chinese shadow plays.

MECHANICAL DRAFTING ESSENTIALS—Walter E. Farnham and Francis T. McCabe—*Prentice-Hall*, 196 p., illus., paper, ring binder, \$3.65. Combined text and workbook.

MODERN ADVANCES IN INORGANIC CHEMISTRY—E. B. Maxted—*Oxford*, 296 p., illus., \$7.00. A British review of recent developments in this field.

THE NEW QUIZ BOOK—Albert H. Morehead and Geoffrey Mott-Smith—*Penguin*, 144 p., paper, 25 cents. With answers.

PLANTS AND ENVIRONMENT: A Textbook of Plant Autoecology—R. F. Daubenmire—*Wiley*, 424 p., illus., \$4.50. Of interest not only to students of botany and agriculture, but to anyone concerned with plant growth and man's physical environment.

PROPERTIES OF ENGINEERING MATERIALS—Glenn Murphy—*International Textbook Co.*, 2d ed., 459 p., illus., \$4.50. Text for engineering students.

THE SCIENCE OF PLASTICS: A Comprehensive Source Book Based on the Original Literature for 1942-1946, Vol. I—H. Mark and E. S. Proskaur, Eds.—*Interscience*, 632 p., illus., \$9.00. A book of abstracts.

SWEDEN, THE MIDDLE WAY—Marquis W. Childs—*Penguin*, rev. ed., 178 p., paper, 35 cents. An account of the experience of a modern European country in attempting to avoid the political extremes.

TECHNIQUES OF OBSERVING THE WEATHER—B. C. Haynes—*Wiley*, 272 p., illus., \$4.00. Written for high-school and college courses by the chief of the observations section, U. S. Weather Bureau.

TOOLS: And How To Use Them for Woodworking and Metal Working—Alfred P. Morgan—*Crown*, 352 p., illus., \$3.00.

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OF SCIENCE, Vol. 50—*Kansas Academy of Science*, 367 p., illus., paper, \$2.00
 THE WEEKLY READER PARADE—Editors, My Weekly Reader—*Simon and Schuster*, 116 p., illus., \$1.50. An attractive book for young children containing a considerable amount of science.

WHAT ELECTRONICS DOES—Vin Zeluff and John Markus—*McGraw-Hill*, 306 p., illus., \$3.00. An explanation of how hundreds of electronic devices work, written by associate editors of *Electronics*.

Science News Letter, February 14, 1948

PHYSIOLOGY

Sex Influences Malaria

➤ SEX has something to do with the severity of malaria, at least in poultry. Two recent studies, one on chickens, the other on ducks, have closely parallel indications on this point.

The research on chickens, which was carried out by Drs. B. F. Bennison and G. Robert Coatney of the National Institute of Health, appears in *Science* (Feb. 6). They inoculated young chicks with the germs of a type of malaria peculiar to fowls. Subsequent examination of their blood showed that the female chicks were "taking it harder" than were the future roosters. The young females also got less benefit from treatment with quinine than did their brothers.

The experiments on ducks were carried out on adult birds by Dr. William Trager of the Rockefeller Institute for Medical Research. He found similar differences between females and drakes. This held, however, only when the ducks were not actively producing eggs. Egg-laying females were less affected than their inactive sisters.

This indication that the presence of the primary female sex hormone in the blood has a suppressive effect on the malaria germs is not borne out by one experiment performed by Drs. Bennison and Coatney. Their chicks, of course, were not producing the female sex hormone because they were immature. When this hormone was injected into them, it failed to affect the sex difference in severity of attack by the malaria parasites.

Whether these results on chicks and ducks have any significance in the several types of human malaria is still an unsettled question. Drs. Bennison and Coatney have checked over a large number of clinical records, and find no significant differences between men and women patients.

However, there is an opportunity to make a controlled test, because parietic patients are sometimes purposely given malaria infections to produce a fever that will benefit their worse malady. It is proposed to make a careful study of a considerable number of such therapeutic

malarias, in the hope of obtaining a more definite answer to this newest angle in the age-old riddle of the sexes.

Science News Letter, February 14, 1948

Science Service Radio

➤ LISTEN in to a discussion on sounds from the sun on "Adventures in Science" over Columbia Broadcasting System at 3:15 p.m. EST Saturday, February 21. Grote Reber, radio physicist at the National Bureau of Standards, will be guest of Watson Davis, director of Science Service. Mr. Reber will tell you of the hissing and popping radio noises he has intercepted from the sun and stars.

Science News Letter, February 14, 1948

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⚙️ **ICE CUBE TRAY**, composed of separated plastic compartments which hang from a flat rack over an aluminum base, permits easy separation of the cubes without the use of water. The rack may be slid entirely or partly off the base, and a cube removed by finger pressure on the plastic compartment.

Science News Letter, February 14, 1948

⚙️ **MANICURING TOOL**, an electric device which resembles the ordinary electric razor in size and appearance, vibrates files, buffers or cuticle rollers rapidly back and forth over the fingernail. It is in a plastic case shaped for easy handling.

Science News Letter, February 14, 1948

⚙️ **NEEDLE-SYRINGE DEVICE**, to enable blind diabetics to use insulin without help, holds the insulin container and the syringe and, by means of a metal guide, slips the needle into the exact center of the self-sealing rubber container top. Notches on the guide permit measurement of the amount of insulin taken into the syringe.

Science News Letter, February 14, 1948

⚙️ **PUSH-BUTTON telegraphy** has entered the airline communications field. It is a switching center, a section of which shows in the picture, through which telegrams are flashed with speed and efficiency. Each message is typed



only at the point of origin; pushing a button gives an incoming message a route to its destination.

Science News Letter, February 14, 1948

⚙️ **SOLDERING IRON** with a gun-grip handle makes it easier to put the heated point directly on out-of-the-way spots where solder is needed. It is a lightweight tool, electrically heated, in a plastic casing which protects the user from heat.

Science News Letter, February 14, 1948

⚙️ **INSULATING PLASTER**, a lightweight, fire-resisting, granular material

mixed with water to give a plastic material, forms on the walls a durable insulating coat of plastic impregnated mineral cork which also has sound-absorbing properties. It does not crumble when exposed to fire, it is claimed.

Science News Letter, February 14, 1948

⚙️ **RADIOACTIVITY** measuring instrument, fountain-pen sized, can be read at any time by looking through a cupped eyepiece toward a light source, and does not need the usual electrostatic voltage indicator. Within it, the observer sees a magnified scale upon which indicating lines show the amount of radiation.

Science News Letter, February 14, 1948

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Question Box

GEOLOGY

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MEDICINE

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PHYSIOLOGY

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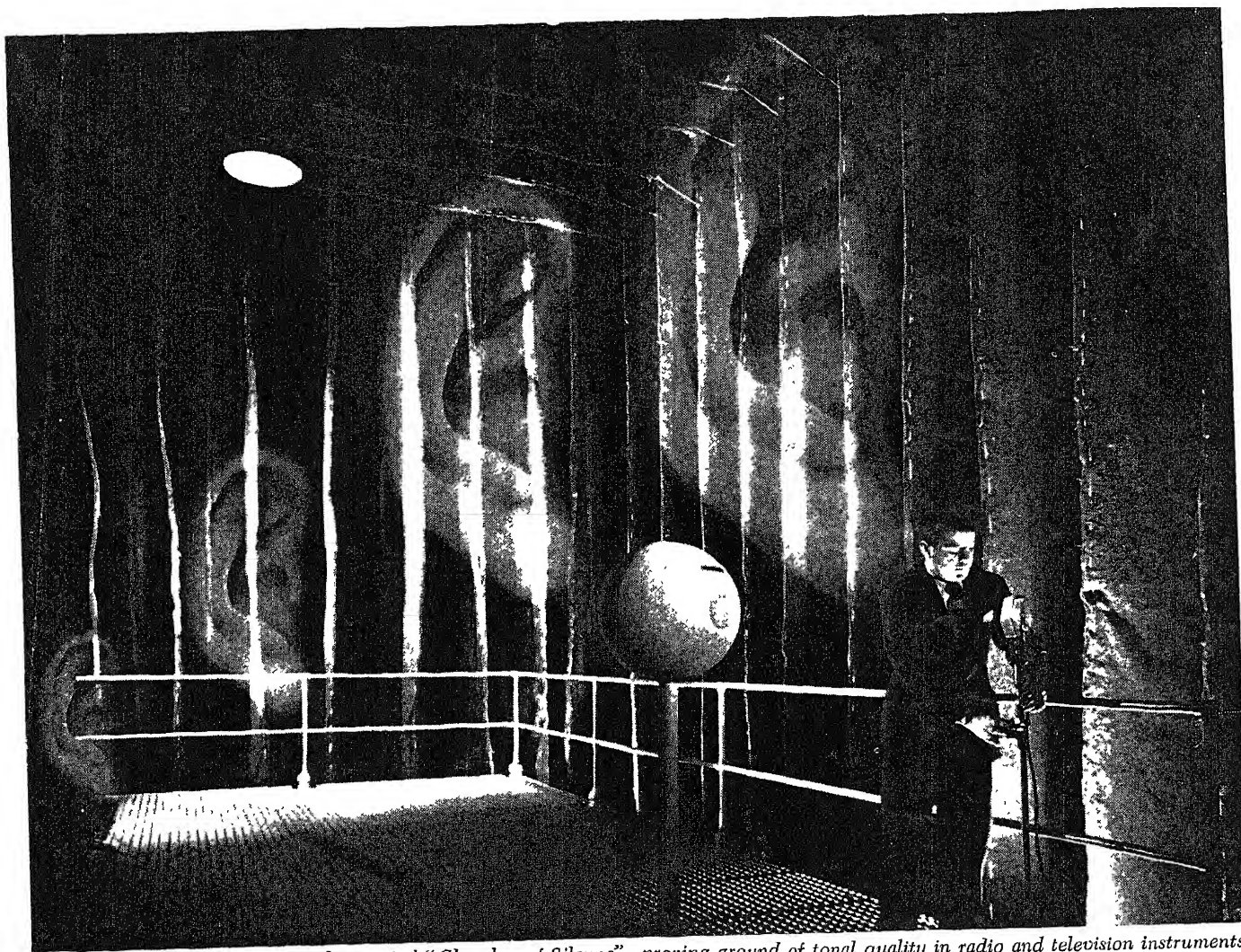
THE WEEKLY SUMMARY OF CURRENT SCIENCE • FEB. 21, 1948



Beware the Hunter!

See Page 121

A SCIENCE SERVICE PUBLICATION



RCA Laboratories' "Chamber of Silence"—proving ground of tonal quality in radio and television instruments

Ever hear SILENCE?

You walk into an eerie room. The doors swing shut and you're wrapped in a silence so complete that it's an effort to listen. Sound in this vault-like cavern is reduced to the minimum of hearing.

But even *silence* has a sound of its own. Faintly you hear a subdued hiss; sometimes a soft hum. Scientists have suggested this may be the "noise" of molecules hitting the eardrums. Others wonder if it is caused by the coursing of the body's bloodstream.

On the walls, ceiling, beneath the open, grated floor of this RCA sound laboratory,

hangs enough heavy rug padding to cover 250 average living rooms. Sound is smothered in its folds—echoes and distortion are wiped out.

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RADIO CORPORATION of AMERICA

MEDICINE

Q Fever Poses Problem

Discovery of these disease germs in raw milk has added a new mystery to an already mysterious disease. But you don't get it from drinking milk.

➤ A NEW mystery has been added to that already mysterious disease, Q fever. The new mystery comes from the discovery of Q fever germs in raw milk. The discovery was made by Drs. R. J. Huebner, R. R. Parker and C. C. Shepard and Parasitologist W. L. Jellison of the U. S. Public Health Service and Dr. M. D. Beck of the California State Department of Public Health.

How the Q fever germs get into the milk and how they spread from the milk to humans make up the latest mystery.

You don't get Q fever from drinking milk, so far as the scientists can find. But, they say, there appears to be "a distinct possibility" that infected milk is a source of Q fever infection in man through some "as yet undetermined" way.

Q fever was first discovered among stock handlers in Queensland, Australia. That is where it gets its name, Q for Queensland. There have been outbreaks among stock handlers and packing house and stockyards workers in this country, and among laboratory workers. There was no suggestion that milk had anything to do with these outbreaks. Scientists thought it was most likely the germs spread through the air and were inhaled into the lungs.

In Los Angeles County last spring, however, Q fever attacked 17 persons and another 100 cases have since been reported in Los Angeles, Ventura, Santa Barbara and Orange Counties. More than half the patients lived near or worked in dairies. A fairly extensive survey showed that from one-tenth to one-fifth of the dairy cows in the Los Angeles area have antibodies for Q fever in their blood serum.

These findings led to extensive testing of milk from the cows of four dairies. The germs were found in milk from each of the dairies.

The cows apparently are not affected by the germs. They seemed to be healthy and some were among the best milk producers in the herds.

Pasteurized milk did not have Q fever germs in it after pasteurizing even when they had been in the milk before pasteurizing. So those who drink pas-

teurized milk need not worry about getting the disease from milk.

How you could get Q fever from milk without drinking it remains the mystery. The scientists are continuing to work on it.

Science News Letter, February 21, 1948

BIOCHEMISTRY

Biochemistry Fellowships Announced by Foundation

➤ FELLOWSHIPS for study toward Ph.D. degrees in fields of chemistry related to biological problems are available at the Biochemical Research Foundation at the University of Delaware at Newark.

The Foundation recently completed an investigation of the biological effects of irradiation for the atomic energy program and is continuing longer projects on basic problems of cellular growth.

Fellowships which are open to applicants holding M.S. degrees offer annual stipends of \$1,800.

Science News Letter, February 21, 1948

PUBLIC HEALTH

Pick New Surgeon General To Replace Retiring Head

➤ THE appointment of a new Surgeon General for the U. S. Public Health Service, Dr. Leonard A. Scheele, and the retirement of Dr. Thomas Parran when his term expires on April 6 corresponds to the periodic changes of Chief of Staff of the Army. The object of such changes is to provide opportunity for advancement of other officers in the service.

Dr. Parran might have been retired after his first term if the war had not by then been so close and Dr. Parran so involved in planning for the emergency that a change might have been unwise. His retirement now does not mean that he will retire from public health work. Instead he is likely to continue such service in an international field. His experience along such lines and his conviction that health is an international problem suggest that he may take an increasing part in the World Health Organization as that develops further. He is at present

and will continue as United States representative on WHO's interim commission.

Dr. Scheele, like Dr. Parran, is known to be a man of deep social consciousness. Born in Fort Wayne, Ind., on July 25, 1907, he did his undergraduate work at the University of Michigan and received his medical degree from Wayne University, Detroit, in 1934. Immediately after he was appointed to the regular commissioned corps of the U. S. Public Health Service. After the usual tours of duty as quarantine officer and in public health administrative work, he spent two years as special fellow in cancer research at Memorial Hospital, New York, and has since devoted himself to cancer control except for special assignments on war duty. These included organizing field casualty work for the Office of Civilian Defense and duty in Sicily, Italy, London and Germany, the last on the Allied Control Council under General Lucius Clay. Since the war he has served as assistant chief and since last July as director of the National Cancer Institute.

His appointment as Surgeon General, if confirmed by the Senate, is not expected to bring any immediate or drastic changes in Public Health Service policies or activities. His association with cancer research and control activities does not mean that he is uninterested in other phases of public health work and he is known as an able administrator.

Science News Letter, February 21, 1948



APPOINT NEW HEAD — Dr. Leonard A. Scheele will be the new Surgeon General of the U. S. Public Health Service, when the Senate confirms his appointment.

ASTRONOMY

Look for Comet Bester

It will be visible just before sunrise at the end of this month or the first week in March and may be seen by the unaided eye if it is a dark, clear night.

► **STAR-LOVERS** in the Northern Hemisphere will have a chance to see a comet not many days hence. It will be speeding toward the northern heavens, heading for the Big Dipper.

On a dark night with clear skies you may be able to pick it up with the unaided eye, but a pair of opera glasses or binoculars will help you identify it and see it in detail.

This comet was first discovered late last September. When spotted by Michiel J. Bester of Harvard's South African station, it was only a hazy splotch of light, noticeable because it changed its position among the stars. Since then it has begun to brighten and develop a tail.

About the middle of February, when it made its nearest approach to the sun Comet Bester was brightest. It can not yet be seen, however, because its light is lost in the brilliance of the sun.

Observers in the Northern Hemisphere may possibly first spot the comet late this month. But it is more likely that they will not see it until the first week in March, reports Dr. Leland E. Cunningham of Students' Observatory, University of California at Berkeley, who calculated its path.

The comet will probably appear quite suddenly. It will be found by some "night owl," as it will be visible just before sunrise. It will be moving quite rapidly, heading north.

Comet Bester, when discovered, was little more than a cluster of cosmic dust and gas. Actually there is less material in the head of a comet than in the smallest of the minor planets.

At first it shone only by reflected light. But as it approached the sun, the comet itself began to give off a little light. Today the dust reflects the sunlight and the cold gases shine by fluorescence.

On Feb. 16 the comet approached within 70,000,000 miles of the sun. This is closer to the sun than the earth ever gets and within a few million miles of being as close as the planet Venus comes.

Just what this comet will look like when it leaves the vicinity of the sun, astronomers are not venturing to guess. Like comet 1947 n, that gave such a spectacular show in the southern skies last December, it may have a long, thin tail. Then, again, its tail may be quite short and broad, or it may possibly not have any at all. Each comet is different and changes rapidly. When there is a tail, however, it always points away from the sun.

The possible brightness of the comet is another point on which astronomers prefer to hedge. Estimates indicate that it may possibly be as bright as third magnitude, about 20 times as bright as the faintest stars you can see in the country on a clear night. But predictions of a comet's brightness are only guesses at best.

The newest Comet Bester (the young South African astronomer discovered several comets last year), will probably be visible through good telescopes most of the year.

First spotted in the constellation of Eridanus, the comet immediately wandered southward so that comet seekers in the Northern Hemisphere, even those with good telescopes, had only a brief glimpse of it.

Although the comet will be around for some time, early March is the best time to look for it. The comet will be brighter then than later in the month and the moon, being new, will not interfere.

The comet will cross the celestial equator about March 13. From there it

will move rapidly northward through the constellations of Aquila, the eagle; Sagitta, the arrow; and Vulpecula, the little fox. It will travel along the border between Cygnus, the swan, and Lyra, the lyre, into the constellation of Draco, the dragon.

Throughout the following few weeks Comet Bester should be easy to spot as it will be near well-known stars. On March 18, it will be close to the first magnitude star Altair, Dr. Cunningham estimates. On March 29 it will have moved close to the well-known star Beta Cygni. By April 3 it will be about one-third of the way from the first magnitude star Vega to the first magnitude star Deneb Cygni.

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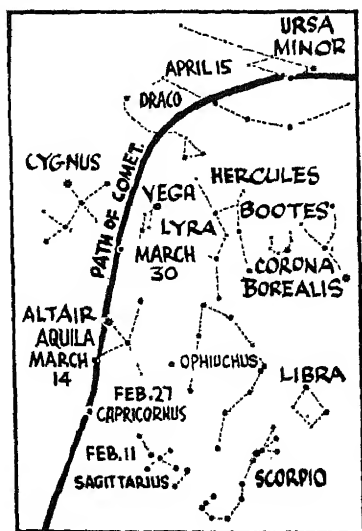
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MEDICINE

Experiments on Prisoners

Reduction in sentence should not be so great as to influence volunteering. This advice is given by a committee of medical and religious leaders.

➤ THE Soviet scientist who is reported as saying American medical scientists follow Nazi methods when they use prisoners in medical experiments can find how wrong he is by reading a report in the *Journal of the American Medical Association*, (Feb. 14).

Even when prisoners are given a reduction of sentence in prison as a reward for volunteering their services, the reduction in sentence should not be so great that it could influence them to volunteer for medical experiments. To make sure that it has no influence, the amount the sentence is reduced should be decided in relation to each prisoner and the nature of the experiment.

This, in brief, is the advice given the Illinois Department of Public Safety by a committee of medical, religious and lay leaders appointed by Governor Dwight H. Green of Illinois.

"The most important requirement for the ethical use of human beings as subjects in medical experiments is that they be volunteers," the committee states.

"Volunteering exists when a person is able to say 'yes' or 'no' without fear of being punished or of being deprived of privileges due him in the ordinary course of events."

An excessive reduction of sentence would be "inconsistent with the principle of voluntary participation," the committee explains, because it might exercise undue influence in gaining the consent of the prisoners to serve as subjects if their sole motive for doing so is to gain a reduction in sentence.

Prisoners are not the only persons who have volunteered for experiments planned to advance human welfare. Medical scientists, medical students, soldiers, sailors and others have also volunteered. These experiments have always been carried out according to certain ethical principles and rules.

One such rule is that if there is any reason to suspect that death or disabling injury may occur, as in experiments such as those of Walter Reed which showed the mosquito spread yellow fever, "then medical scientists should serve or should have served as volun-

teers along with nonscientific personnel," the committee states.

Consent of the volunteer must be obtained, without coercion, and he must have been informed of the dangers, if any.

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GEOLOGY

Home-Made Seismograph Detects Quake in Alaska

➤ AN earthquake that shook Fairbanks, Alaska, recorded itself on a seismograph built by a high school senior, Michael D. Lubin, 17, of Tottenville High School on Staten Island, N. Y. Although of simple construction, the instrument operates on the same principles as the elaborate mechanisms used by professional seismologists.

The seismograph he has constructed is of the type known as the Bosch-Omori, from its original inventors. Its foundation consists of a heavy block of concrete sunk in the earth, with a vertical pillar rising from it. Projecting horizontally from this, near its base, is a hinged horizontal arm or boom, which carries a heavy weight. An oblique wire or rod to the top of the pillar helps support the weight, which is free to swing as a horizontal pendulum.

A long but light continuation of the boom carries a writing point at its end. This rests lightly on smoked paper stretched over a horizontal cylinder or drum, which is slowly turned by clockwork. This is the recording mechanism.

When the waves from a distant earthquake, undetectable by ordinary human senses, reach the instrument they cause the vertical pillar to sway by a microscopic amount. The inertia of the heavy pendulum mass tends to hold it motionless against the swing of the boom. This in turn produces an exaggerated amount of apparent motion at the recording end, which registers itself as the familiar wiggly line of a seismogram.

Mr. Lubin states that his instrument is not as sensitive as he would like, because it had to be set in the clay subsoil of Staten Island, 50 feet above the nearest bedrock. Loose material like clay does not transmit waves so well as solid rock,



COMET DISCOVERER—Michiel J. Bester of Harvard's South African station last year discovered three comets out of a total of only nine new ones found.

During the second week of April it will be getting closer to the North Star. Comet Bester will pass across the constellations of Draco; Ursa Minor, the smaller bear; Draco again and into Ursa Major, the larger bear.

On April 13 the comet will be directly north of the "head of Draco." On April 21 it will pass between the Guardians of the Pole Star, Beta and Gamma Ursa Minoris. By this time, however, the comet will probably have faded so much that it will no longer interest amateur astronomers. But it should still show up well even then when seen through a telescope.

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INVENTION

Blade Kills Weeds by Cutting Underground Roots

➤ AN implement that kills weeds as cutworms kill your favorite garden plants, by clipping off their roots below the ground surface, is the invention on which Charles S. Noble of Nobleford, Alberta, has received U. S. patent 2,432,035. Mr. Noble is already well known for his system of sub-surface cultivation, which stirs the soil with minimum disturbance of surface-protecting vegetation or litter. In the present invention, a gently arced blade is drawn along a couple of inches under the surface, clipping off weed roots as it goes. The surface layer rides over the arc and drops back into place.

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such as forms the foundation of professional observatories like that at Fordham University. Nevertheless, this instrument has in the short term of its operation recorded one major earthquake 3,300 miles away, in Fairbanks, Alaska, and a

number of other shocks at lesser distances.

Mr. Lubin is a winner in the Seventh Annual Science Talent Search, and will be in Washington from Feb. 27 through March 2, at the Science Talent Institute.

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GENERAL SCIENCE

Scientists in Legal Mixup

Criminal prosecution endangers America's greatest scientists for their roles in contributing to the winning of World War II.

► HUNDREDS of America's greatest scientists "stand in theoretical danger of prosecution under the criminal statutes because of their contributions to the winning of a war," a former official of the wartime Office of Scientific Research and Development charged.

This ironic situation involves legal technicalities and some obscure legislation which Congress did not get around to passing. The scientists include Dr. Vannevar Bush, president of the Carnegie Institution of Washington and former director of OSRD, Pres. James B. Conant of Harvard and countless other leaders in science and education.

These men, who organized the scientific effort which produced radar, the proximity fuze and many other important developments which played important roles in winning World War II, served on OSRD and other groups without getting a salary. This made it possible for these men to continue in their positions as leaders of non-government organizations. Many of them might not have been able to serve as important planners and advisers to victory if they had been required to resign their peacetime jobs.

But this also has left them in a position of having violated the law, Pres. Irvin Stewart of West Virginia University, disclosed in a new book, *"Organizing Scientific Research for War"* (Little, Brown and Company, Boston, 358 pp., \$5.00).

The legal difficulty comes from the fact that OSRD and some of its committees entered into contracts with several of the nation's best-known scientific institutions while leading officials of the institutions were serving with OSRD. Examples cited by Dr. Stewart include Harvard University, Massachusetts Institute of Technology, California Institute of Technology, Columbia University, University of Illinois, University of

Pennsylvania, Johns Hopkins University and Bell Telephone Laboratories.

Dr. Stewart, who served as deputy director of OSRD under Dr. Bush, points out that the wartime organization did not permit members to participate in consideration of contracts with their own organizations. But the legal dilemma was never formally solved.

In 1941, Dr. Bush received an opinion that his own position was not in violation of the law. Then, in 1943, a ruling on local OPA boards apparently made the scientists liable under sections 109 and 113 of the Criminal Code. In both the Seventy-seventh and Seventy-eighth

Congresses legislation to make the scientists exempt from these sections of the code failed to pass.

Under the Criminal Code, violators of section 109 "shall be fined not more than \$5,000 or imprisoned not more than one year, or both. . . ." Maximum penalties under section 113 are a fine of \$10,000 and not more than two years' imprisonment.

Dr. Stewart believes that, as things stand, many famous scientists have violated these sections.

"Fortunately, it does not seem at all likely that any of them will ever be prosecuted for those technical violations, for in practice the OSRD avoided situations involving actual conflicts of interest," he explains, "but there is no denying the theoretical possibility is there."

The legal tangle is only one of several technical difficulties, outside the laboratory, which OSRD faced in organizing American scientists for World War II. Manpower, supplies, security and publicity were all a part of the administrative headaches which plagued science leaders as well as military officials in the war. And Dr. Stewart's report on administering science indicates that even leading scientists were not able to develop a completely satisfactory "redtape-snipper."

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HALF-TON MOVER—Claimed to do work of four men with wheelbarrows, this machine has a capacity of 1000 pounds of wet or dry materials and the ability to climb a 20 per cent grade with a full load. It has a three horsepower air-cooled engine and operates for eight hours on three gallons of fuel. It can be equipped with a bucket or a sturdy steel and wood platform deck and there is even a snow plow attachment available.

MEDICINE

Cut Child Cancer Deaths

Early recognition and treatment can save many young children from this killer. Period of greatest mortality is from birth to the fifth year.

➤ TOO many babies and children are dying needlessly of cancer. Many could be saved by early recognition and treatment, Dr. Harold W. Dargeon of Memorial Hospital, New York, declares in a report in the *Journal of the American Medical Association* (Feb. 14).

A constantly hopeless attitude when cancer is discovered in a child is "not justified," he states.

From birth to five years is the age period when the largest number of cancer deaths occur in children. It is also the period when a large number of curable cancers in children are found.

The family doctor is the key person in the fight to cut child cancer deaths, Dr. Dargeon declares. It is the family doctor who is first consulted about a child's bruises and bumps, his unusual growth or failure to grow, his problem behavior and his vague illnesses which might be early signs of cancer. His opinion and advice are the basis for the family's decisions.

Cancer, leukemia and other tumors have become such great killers of children that in the past 10 years they exceeded almost all common diseases among the causes of death in certain age groups during childhood.

In New York, Dr. Dargeon reports, these diseases and Hodgkin's disease killed 392 children during 1942, 1943 and 1944. During the same three years, tuberculosis killed 291, meningitis 150, whooping cough 154, infantile paralysis 86, syphilis 55, measles 35, and scarlet fever 17.

The six places in the body where cancer most often attacks in childhood are: the bones, the kidneys, the eye and eye socket, the lymphatic and blood-forming organs, the soft tissues such as muscle and fat, and the nervous system.

Proper treatment for cancer in children is now offered in many parts of the country, Dr. Dargeon states.

"The current necessity is for greater attention to earlier diagnosis."

Children should have health examinations every month from birth to one year of age, every three months from one to six years and twice a year thereafter, as part of the fight to detect and remove

curable cancer. These examinations, Dr. Dargeon says, should include X-rays of the chest and a complete blood count in addition to other pediatric routines.

Investigation and repeated investigation should be made, he stresses, in the case of a child who has symptoms not quite typical of a common disease, or who is precocious or retarded, especially if the departure from the norm has been increasingly apparent or if he has periodic vague illnesses with periods of normal health between attacks.

Unusual growth or retardation of growth of the body as a whole or some member of it should suggest to the doctor the possible presence of a tumor.

The child who is a behavior problem may also have a tumor or cancer.

Tumors other than cancer should not be taken lightly.

Any tumor, whether cancerous or not, may cause death if its size, rapidity of growth, location or interference with function seriously disturbs vital activities, Dr. Dargeon warns. Most striking examples of benign, that is, non-cancerous, tumors which are very serious are those within the head. They involve such important structures that, though for the most part not cancerous, they may result in high mortality.

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MEDICINE

Vitamin E Relieves Pain Caused by Knots in Feet

➤ TRY large doses of vitamin E, before resorting to surgery, for patients with painful knots of tissue on the soles of the feet, Dr. J. Vernon Luck of Los Angeles advised fellow orthopedic surgeons in Chicago.

The condition is called plantar fascia, or Dupuytren's contracture. When it occurs on the palms of the hands it is called palmar fascia.

When the disease affects the palm of a hand there is a drawing down of the fingers into the palm. This condition, common in middle aged and elderly men, is due to a thin, tough tissue between the skin and muscles and tendons, or leaders, of the palm.

The patient becomes unable to straighten one or more of his fingers, noticing at the same time the appearance of small, tumorlike masses and cords of very hard tissue beneath the skin of his palm.

"In the foot condition, knots of tissue and cords develop in the sole, similar to those that develop in the hand," Dr. Luck said. "It is very rare, however, that the toes are drawn down in the manner that the fingers are flexed into the palm. The knot-like structures in the sole often have been mistaken for cancerous tumors. In other cases the true condition was not recognized and the patients were treated with arch supports without benefit.

"Treatment in the past has been chiefly surgical, particularly for the hand lesions.

"Treatment of the feet also has been surgical, but in recent years several investigators have obtained good results with large doses of vitamin E. The patients have been relieved of pain, but the treatment actually affords little relief of the contractures."

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MIDGET ELECTRIC MOTOR—
World's smallest, this pygmy power plant is so tiny that a half-dozen fit comfortably in a lady's thimble. Called an "Electrotor," it is 3/16 of an inch in length and diameter, weighs less than a gram, requires 1½ volts, and runs with high efficiency at 7,000 r.p.m. It is one of a series of sub-miniature motors invented by J. V. and J. E. G. Eurich, brothers, of Lancashire, England and will be manufactured in this country.

GENERAL SCIENCE

Czechoslovakian Chemists Begin Study in U. S.

➤ TWO Czechoslovakian chemists have arrived in this country to begin studies as the first fellows in a program financed by the American Chemical Society through the United Nations Educational, Scientific and Cultural Organization (UNESCO).

Dr. Ivan Vavrch, chief chemist of a government beet-sugar factory at Cerekvice, will study colloid chemistry at the Massachusetts Institute of Technology, while Dr. Milos Hudlicky of the Institute of Organic Chemistry, Prague, will specialize in fluorine chemistry at Ohio State University. The young scientists, both 28, will work in this country six months under terms of the grants.

Funds for the fellowships are provided in a \$25,000 donation to UNESCO made by the American Chemical Society, the first group to make such a contribution to the UN group. Other countries which are expected to send chemists to this country for the six-month study period of the grants are China, Poland, Greece and the Netherlands.

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BOTANY

Pollen Grains Measured By High School Student

➤ POLLEN grains are subjects of exact science to Elmon Lee Coe, 16-year-old senior at North Phoenix High School in Phoenix, Ariz. Not content with sketching them as he observes them through his microscope, he uses a measuring device to obtain an accurate record of their dimensions, in order to make them easier to identify.

Pollens from desert flowers have been his special interest. He has measured and made drawings of grains from several kinds of cactus, including the sahuaro or giant cactus, as well as those of century plant, yucca, palo verde, mesquite and greasewood. However, he has also paid considerable attention to wildflowers of the Southwest, such as gaillardia, prairie coneflower and Indian pink; and to cultivated plants like date palm, lemon, oleander, alfalfa and Shasta daisy. Also included in his collection are the pollens of such introduced weeds as Queen Ann's lace, dayflower, sow-thistle and Johnson grass.

Because the low-power microscope which he was using did not give the magnification he wanted, Mr. Coe in-

troduced an extra lens into its optical system. When water proved an unsatisfactory medium in which to examine the grains, he took to xylol, a light oily medium.

In one of his hobbies he is not likely to have many imitators: he raises scorpions.

His willingness to experiment with optical instruments has led him to the construction of a spectroscope and a small telescope, and to the modification of the lens of his camera so that he can obtain greater magnification in making photographs of insects in his collection.

Mr. Coe is one of the winners in the Seventh Annual Science Talent Search for the Westinghouse Science Scholarships.

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ENGINEERING

Plastic Foam Materials Insulate Against Cold

➤ FOAM is the latest form of substance used in keeping heat out of subzero chemical materials.

Two plastic materials, puffed or whipped up to include large quantities of air, were described to the American Institute of Chemical Engineers meeting in New Orleans, as efficient low-temperature insulators.

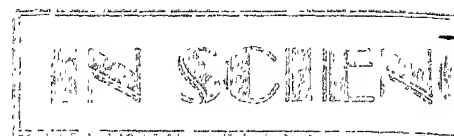
One of them is a urea-formaldehyde foam, with the trade name of U. S. Flotofoam, which can be used in either shredded or block form. E. C. Van Buskirk and C. C. Surland of the United States Rubber Co., Mishawaka, Ind., reported that it weighs only eight-tenths of a pound per cubic foot.

Another insulation material, used in cold storage rooms, is a polystyrene plastic in foam form, called Styrofoam. O. R. McIntire and R. N. Kennedy of the Dow Chemical Company told how it is superior to corkboard usually used.

Glass in cellular form is also used to insulate low-temperature equipment, Victor Sanders, of the Pittsburgh Corning Corporation, told the chemists, while C. B. Bradley and J. F. Stone of the Johns-Manville Sales Corporation predicted that still more new insulating materials will be developed through research.

Another new material is a fibrous silica which Leon Parker and John J. Foster of H. I. Thompson Co. reported was developed as insulation for jet aircraft. New uses of this material in various forms were predicted because of its high temperature resistance in thermal, electrical and acoustical applications.

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PHYSIOLOGY

Chemical Treatment Shows Protein Position in Cells

➤ A NEW tool for prying into the secrets of cell life is a compound of phosphorus and tungsten known as phosphotungstic acid. It has been used by Drs. A. Engstrom and M. A. Jakus of the Karolinska Institutet, Stockholm, to find out where in the cell the greatest concentrations of proteins occur.

Proteins, which are the food materials that become the actual replacement parts of living matter, have the property of binding phosphotungstic acid. The areas in which this occurs become less transparent to X-rays, so that cells treated with the acid and then irradiated will give light-and-dark patterns telling of the distribution of the proteins.

The technique is not yet fully perfected, the two Swedish researchers state in a letter to the editor of the British journal, *Nature*, (Jan. 31) but it is expected that further work now in progress will overcome certain present difficulties.

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CHEMISTRY-ASTRONOMY

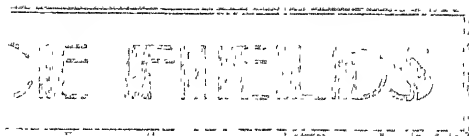
Hydrogen, Helium Are Most Common Elements in Cosmos

➤ ELEMENTS most abundant in the visible universe are not necessarily the same as those most abundant on our particular planet, Dr. Harrison Brown of the University of Chicago stated before the meeting of the American Physical Society in New York.

In as much of the universe as the greatest telescopes can probe, the most abundant chemical elements are hydrogen and helium, followed in order by oxygen, nitrogen, carbon and neon. Of these, helium and neon were for long mere chemical curiosities, and although both are commonly used now neither is abundant.

Taking the earth as a whole, Dr. Brown said, the Big Four are oxygen, silicon, magnesium and iron. Familiar though they are in everyday life, carbon, nitrogen and hydrogen constitute only a negligible fraction of the planet's total mass.

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MEDICINE

Anti-Flu Vaccination Failures Are Reported

➤ FAILURE of influenza vaccine to give protection in two different boys' schools is reported in the *Journal of the American Medical Association* (Feb. 14).

The reports are by Dr. Arie C. Van Ravenswaay of Boonville, Mo., on experience at the Kemper Military School, Boonville, and from Drs. M. M. Sigel, F. W. Shaffer, M. Wiener Kirber, A. B. Light and W. Henle of Philadelphia. The school in this experience is in New Jersey but is not further identified.

Both Dr. Van Ravenswaay and the Philadelphia group point out that other physicians have reported similar experiences with influenza vaccination last winter. In all these failures, the trouble seems to have been that a new strain of influenza A virus was responsible for last winter's outbreaks. This strain had not been included in the vaccines then available.

Suggestions for improving both the vaccine and tests for detecting the particular strain of 'flu virus in a given outbreak are given by the Philadelphia scientists.

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MEDICINE

Internal Organs Damaged In DDT-Poisoned Victim

➤ THE third death by DDT poisoning since this famous insect killer was introduced in 1943-1944 is reported by Dr. Nathan J. Smith of the Veterans Administration Center, Wadsworth, Kans., in the *Journal of the American Medical Association* (Feb. 14).

The victim was a 58-year-old laborer who accidentally drank about four ounces of a 5% solution of DDT. He immediately recognized his mistake and drank a quart of milk within a few minutes after swallowing the poison. He followed this by several glasses of beer. Neither this nor various other measures helped and the patient finally, five days later, went to the VA center for medical treatment which also, unfortunately, failed to save him.

To physicians the interesting point in

Dr. Smith's report will be the details of kidney and liver damage found at autopsy. This patient was the first killed by DDT who lived long enough after the fatal dose for changes in the internal organs to develop to the point where they could be seen after death. Heretofore the only information on how the insect killer damaged was obtained from studies of laboratory animals. These changes seen in laboratory animals are, Dr. Smith reports, "not unlike" those seen in this latest human victim.

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MEDICINE

Streptomycin Cure of Plague Reported in India

➤ STREPTOMYCIN cure of plague was reported by General Sir Sahib Singh Sokhey, director of the Haffkine Institute in Bombay.

In experimental tests with plague-infected mice, streptomycin treatment resulted in 100% cures.

When 87 human patients with bubonic plague, including 15 in an advanced, usually fatal stage of the disease, were given streptomycin treatment, all but two recovered.

The streptomycin used in these studies and to treat the patients was donated by Dr. Robert D. Coghill of Abbott Laboratories, North Chicago, Ill., and the British Medical Research Council.

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ZOOLOGY

Bear With Six Cubs Reported from Canada

➤ BLACK BEAR sees Mama Dionne's quint and goes her one better—with sextuplets. What is believed to be the only case on record of sextuple birth in bears has been reported to Prof. William Rowan of the University of Alberta at Edmonton, Alberta, in a sworn statement by Tom Wykstandt, a veteran Canadian trapper.

Mr. Wykstandt met a female black bear, which seemed to be rather unusually thin. He shot her and also all of her family, which turned out to total six black cubs, all of the same size and apparent age.

Mr. Wykstandt, who is thoroughly familiar with the area over which he hunts and traps, declares that no other female bears were known to be in the neighborhood, although an adult male black bear was trapped within a few days at the same spot.

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WILDLIFE

Buffle-Head Ducks Design On New Hunting Stamp

See Front Cover

➤ TWO male and one female buffle-head ducks in flight is the design chosen for the Federal "duck stamp" to be used during the 1948-49 hunting season, Albert M. Day, Director of the Fish and Wildlife Service, announced.

This is the fifteenth in the series of migratory bird hunting stamps, all of which show wild ducks or geese of different species in some characteristic flight phase. It will be available at all first and second class post offices on July 1.

The current design, shown on the cover of this week's *SCIENCE NEWS LETTER*, is the work of Maynard Reece, staff artist for the Iowa State Department of History and Archives, Des Moines, Iowa.

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CHEMISTRY

High School Student Does Research on Hard Water

➤ HOW hard is hard water? A high school senior of Oak Park, Ill., David M. Geller, 17, has worked out the answer in terms of the water-softening power of a number of kinds of soap powder and other detergents. He has carried his research out to the fractions-of-a-cent point, telling which compound costs least per unit of hard water softened.

For accurate determination of results, he made up a synthetic hard water by dissolving a known weight of calcium sulfate, most familiar as gypsum, in a known quantity of distilled water. He made up his soap solutions with similar exactness, then added to each sample some of his hardened water, measured drop by drop until the soap was no longer able to produce any foam. This was the neutralization-point of that particular kind of soap.

Soap powders of the more conventional type all functioned rather much alike. Differences in cost, per unit of softening effect, were determined largely by market price per package, reduced to price per ounce. Greatest economy was achieved not by an old-type soap powder but by one of the newer detergents. On a cost-per-unit basis, this was more than 200 times more efficient than ordinary soap powders.

Mr. Geller will go to Washington at the end of this month, to participate in the Science Talent Institute.

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ENGINEERING

Oil Use Overtaxes Production

While the many advantages of this fuel are bringing it into increasing use, refining and transportation create a bottleneck in the available supply.

By A. C. MONAHAN

➤ THE convenience and cleanliness of fuel oil can be blamed in large part for the present so-called shortage. Hundreds of thousands of new oil-burning installations, for both heat and power, have created demands which overtax production.

The bottleneck in the available supply is in refining and transportation. Additional refineries are needed, but these complicated, elaborate plants costing millions of dollars can not be built in a day. Nor can they be built without the necessary steel. Refineries, pipelines, storage tanks, shipping cars and tankers are steel. This metal is a number one essential in the oil industry.

Many thousands of homes have installed oil-burning furnaces since the war, and prewar oil-burners that were converted to coal as a war measure are back on oil again. Thousands of office, school, hospital and factory buildings are now using oil for fuel, one reason being to save labor costs.

Mechanical Power

Thousands of diesel engines are now doing the work formerly done by coal-burning power-plants in factories, and even in locomotives. Mechanical power has made great strides in replacing animal power on the farm, and thousands of jobs on roads, in timber and mines, formerly done by hand labor, are now carried out with oil- or gas-burning machines.

There is enough crude oil in proven reserves in American earth to meet all domestic needs of the next decade or two, even if the requirements increase 50% in the next 10 years as predicted. But petroleum as mined can not be used in a furnace, engine or automobile. It must be refined. That means that it must be purified and separated into its hundreds of usable constituents—asphalt, road oils, lubricating oils, waxes, fuel oil, gasoline, naphthas and many sources of raw chemicals needed in daily life.

Few oil fields are located near consumption centers. That means that elaborate transportation facilities are neces-

sary from fields to refineries, from refineries to distribution centers, and from them to local consumption areas.

Because of the shortage of steel, the enormous cost of erecting refineries, and for other reasons, the oil industry has tried to meet the increasing demand with present plants by searching out and eliminating all bottlenecks in the processes used. Also refineries have been converted from old-type equipment into improved forms wherever possible.

Step-up in Production

The result is a great step-up in production even if not sufficient to meet the greatly increased demands. The supply of fuel oil and gasoline will probably be limited for another year or so.

To make all the usable products that are obtained from petroleum, the crude must go through a cracking process. In this, molecules are broken down, and molecules of a different sort are set up. By cracking, heavy oil can be converted into gasoline. This makes it possible to obtain a much greater quantity of this automobile fluid than can be obtained from the crude by mere distillation.

One of the greatest steps taken in oil refining is the replacement of the early thermal cracking process with the catalytic cracking method. Prewar catalytic cracking methods have now been replaced with what is called a solid "fluid" catalyst technique. This uses an extremely finely powdered dry material which acts much like a liquid in its behavior.

Conversion to the fluid catalyst technique has been one of the most important steps taken by the oil industry. The process is rapid, permits the breaking up of the heavy oil at a lower temperature than would be required otherwise, and influences the cracking in such a way as to give gasoline a lesser tendency to knock. This fluid catalyst technique produced the 100-octane aviation fuel that gave American aviators supremacy over the enemy in the air.

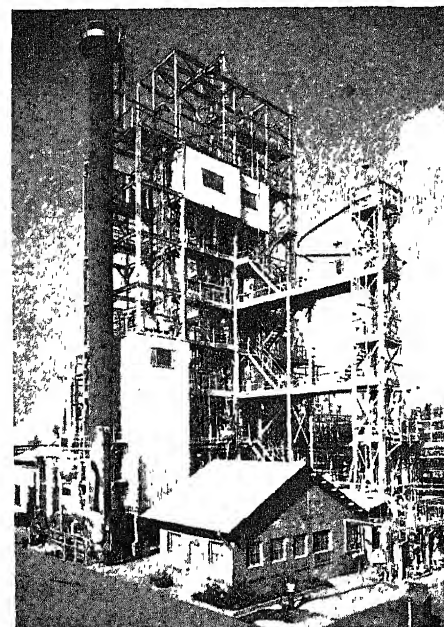
A catalyst is a substance whose presence promotes chemical action in some mysterious way, but which does not itself

undergo any chemical change. In early catalytic cracking of petroleum, a solid clay-like material was used. The great problem was how to mix the gaseous petroleum with it and to separate the results, and particularly how to clean the catalyst of the carbon which collected on it during the process and made it finally valueless.

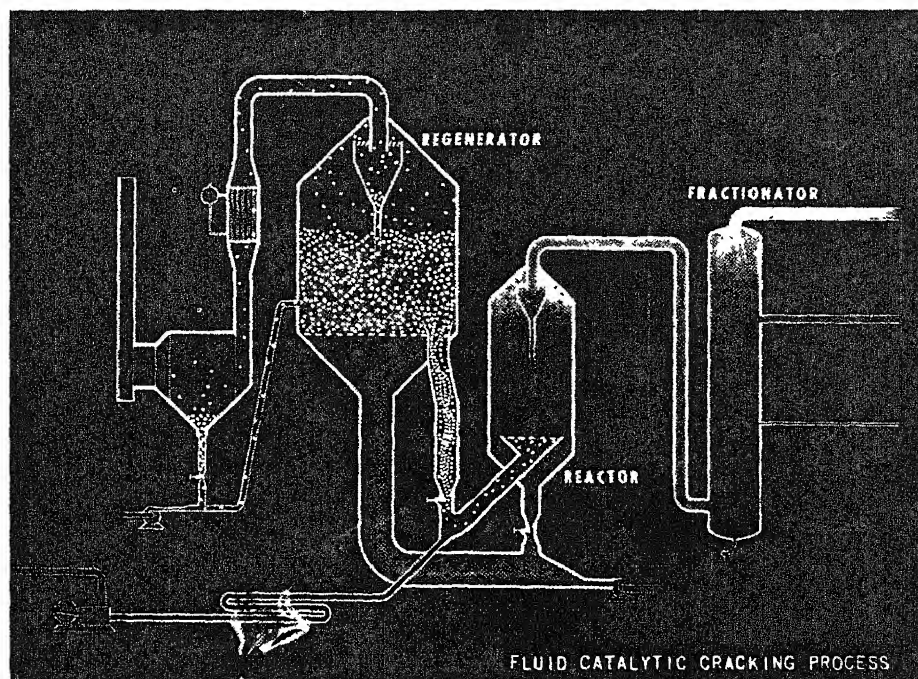
Fluidized Solid Catalyst

These problems are well solved by the fluidized solid catalyst now used. It looks like very fine white sand, and chemically is a synthetic product of alumina and silica. When air from underneath is blown up through the material, its surface becomes much like that of frothy soapy water.

Investigations at the Massachusetts Institute of Technology, sponsored by the Standard Oil Company of New Jersey, pointed the way to the development of this fluidized solid catalyst technique. Further developments were carried out at the company's research center at Baton Rouge. The developments at Baton Rouge were in pilot plant stage when the



PILOT PLANT—The oil industry conducts much research in these plants to determine the best commercial processes. This is one of the new installations at the Esso Laboratories, Baton Rouge, La., owned by Standard Oil.



OIL REFINING—The greatest advance in this field was made when the early older cracking process was replaced by fluidized catalytic cracking method, illustrated in the diagram.

war came. They were put immediately into commercial use, particularly to obtain the 100-octane aviation fuel, and fortunately were successful.

In the operation of the fluid catalytic cracking process, preheated crude oil enters the base of a giant steel retort, called a reactor, which may extend up in the air as high as a 10-story building. It carries in with it catalytic material as a suspended dust, and it passes through a bed of the material in the retort that may be 20 feet thick and 45 feet in diameter.

The suspended dust in the oil settles out in the bed which bubbles on the top much like boiling water. Cracking takes place in this bed, at a temperature of 900 degrees Fahrenheit, as the rising oil vapors come in contact with the sand like grains, and is completed in about 20 seconds.

Part of the catalyst, with carbon clinging to it, rises in the retort with the newly created vapors, but is separated by whirling air and passes by air pressure to a heating chamber, called a regenerator, where the carbon is burned off. Then the cleaned catalyst drops into the entering pre-heated crude, and makes another cycle. There are no mechanical pumps to help it on its journey. The air pressure is sufficient. It is the fluid condition that makes this possible.

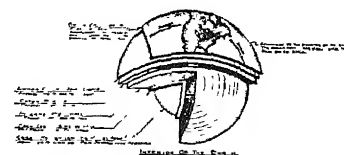
Catalysts are also important in mak-

ing fuel oils and gasoline from natural gas, and from coal. The present known petroleum reserves in the United States will take care of domestic needs only for a decade or two, it is claimed, but America will have home-produced liquid fuels for 1000 years or more. If no more petroleum can be found, it will come from natural gas, coal and oil shale. The coal supply is practically unlimited. There is also a great abundance of oil-producing shale.

Natural Gas Limited

The supply of natural gas is limited, but liquid fuels can be made from it for the next 25 years or so without exhausting the amount needed for gas lighting and heating. Fuel oils and gasoline can be made from natural gas at a cost that will permit their sale in competition with petroleum products. Liquid fuels from coal and shale will cost more to produce.

Already two plants are under construction, one in Texas and the other in Kansas, to use natural gas as a raw material. Much research has been conducted by the U. S. Bureau of Mines and by the oil industry to find the most satisfactory processes. One of the major projects at the Esso Laboratories of Standard Oil (N. J.) at Baton Rouge is concerned with this process. Another is with problems involved in making liquid fuels from coal. The two processes have much in common.



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Note reduced sectional view through the earth, which is only one of many drawings included on this one chart.

BESIDES

The solar system to scale showing comparative size of the planets, their diameters, surface gravity, number of moons, their mean distance from the Sun, and the mean distance between them. A schedule showing the speed of the Earth per day, per hour, per minute and per second on its journey through space along with the Sun, on its orbit around the Sun, and on its axis. A schedule showing the mean distance of the planets from the earth, and their time of rotation, and revolution, and the number of Moons of each. A drawing to scale showing the comparative size of the star Betelgeuse to the orbits of the planets around the Sun. A drawing to scale showing the comparative size of the Sun to the orbit of the Moon around the Earth. Name and diameters of the three largest asteroids, and the number of them charted to date. A scaled drawing showing the curvature of the Earth, and relative distance of the deepest spot in the oceans, and various relative heights above the surface. A "Time Table" for rocket-ships from the Earth to the planets and nearest star in terms of travel times at different speeds. An atomic table giving the melting and boiling points, density, and atomic weights of the elements. A drawing of the Moon with its distance, diameter, temperature and other information. A drawing showing the method of measuring the distance of near stars. A drawing showing the position of comets' tails as they journey around the Sun. A sketch showing the approximate position of our solar system in the Milky Way galaxy. The size of the Milky Way and its period of revolution, and speed of its outer rim. Temperatures at various heights above the earth as measured by instruments on V2 rocket tests, etc etc.

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Do You Know?

Furfural, known for over a century but used commercially only in the past two decades or so, promises to become a very important raw material in chemical synthesis; it is now extensively used in making nylon.

Some gardeners recommend the application of a complete fertilizer to a level lawn while snow is still on the ground; spring thaws will carry the plant food down to the roots to be available when growth starts.

A new *insecticide*, Thiophos 3422 for short, but diethyl nitrophenyl thiophosphate chemically, is claimed to kill a wider range of insects than any chemical now in use including DDT.

Water should not be used to put out a fire around electrical equipment until the current has been cut off at the switch.

A giant plant will soon be constructed in Pennsylvania to use coal in making liquid fuels. Pilot plants of the U. S. Bureau of Mines are pointing the way. The coal is first converted into water gas by a process long used to supply manufactured gas for homes in many American cities. From there on, the conversion of this product into liquid hydrocarbonates is similar to that used with natural gas.

The gases are first converted into carbon monoxide and hydrogen by an incomplete combustion or other process.

These, with the help of an iron catalyst in a fluidized state, become the synthetic hydrocarbonates and water.

There is enough oil shale in America to yield over 95,000,000,000 barrels of gasoline if all could be extracted. When this rock is crushed and heated it gives off hydrocarbon vapors and gases much like those of petroleum which then, of course, have to be refined. The process is still costly, but a government pilot plant at Rifle, Colo., promises cheaper products as better methods are developed.

Science News Letter, February 21, 1948



SCA NEWS

National SCA Meeting

All members of Science Clubs of America are invited to attend by tuning in to CBS radio program on Saturday, Feb. 28, for future of science discussion.

➤ THE first national meeting of Science Clubs of America, with 15,000 clubs in the nation's secondary schools, will be held on Saturday afternoon, Feb. 28, when Science Service's "Adventures in Science" radio program over the nationwide network of the Columbia Broadcasting System will be devoted to this important event.

Originating from the Seventh Annual Science Talent Institute at Washington, being attended by the 40 winners competing for the Westinghouse science scholarships, eminent scientists will discuss "Great Future Problems of Science."

Several hundred thousand SCA members are expected to join the regular radio audience listening to this program directed by Watson Davis and heard over most CBS stations at 3:15 p. m. EST, 2:15 p. m. CST, 1:15 p. m. MST, and 12:15 p. m. PST.

Sponsors and members reading this notice are asked to announce this national SCA meeting to all clubs by circulating notices or posting this article on school bulletin boards.

The meeting will be reported in the SCIENCE NEWS LETTER so that the subject discussed can be considered at individual club meetings later.

SCA Affiliation Without Cost

Any teacher or other adult who is the leader or sponsor of a science club, who has not already done so, should arrange to affiliate with Science Clubs of America. There is no fee for affiliation. As sponsors already affiliated know, the 100-

page SCA Sponsor Handbook, sent free to sponsors, is an essential aid and guide to organizing and conducting a science club. Others may obtain a copy of this book postpaid by sending \$1 to Science Service.

Science News Letter, February 21, 1948

ECOLOGY

Forest Remnant Reveals Character of Former Woods

➤ AN idea of what the great American woods were like in pioneer days is offered in a survey of a forest remnant made by Miss Millicent M. Sawyer, 16-year-old student at Wiley High School in Terre Haute, Ind. Although the tract she studied is only about 20 acres in extent, it gives roothold to no less than 37 species of native trees and shrubs.

The forest remnant is a triangular piece of land containing two creek valleys, a ravine and a central ridge, giving a considerable variety of habitat conditions. Although lumbering was carried on there in earlier times, there has been practically no cutting for almost 60 years, so that the forest has had a chance to re-grow.

Apparently the area was never completely cleared, for Miss Sawyer notes the presence of some century-old beeches with trunks 30 inches in diameter. Presence of numbers of sugar maples suggests that the original stand may have been the old Eastern beech-maple climax forest; dominant at present, however,

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is an oak-hickory association, with patches of other mixed hardwoods on the ridge and the creek bottoms. Among the species infrequently found in this region she lists blue ash, pin-oak, catalpa and Kentucky coffee tree, together with the large shrubs, service-berry and wahoo.

After Miss Sawyer's parents bought the tract as a site for their home, they had a considerable number of over-mature and defective trees felled and sawed into lumber for building. From now on, however, only limited cutting is planned. Miss Sawyer states:

"In the future, with due regard to its natural inhabitants, we plan to 'farm' the woods. All dead trees will be cut

and left to decay. Most of the over-mature trees will be cut, but a few will be left around the building site for their esthetic value. As the young trees reach maturity, they will be cut for lumber and their tops used for fuel. Crowded, deformed and defective trees will be taken for firewood.

"With the good management which we plan to give the tract, it can be not only a pleasant place to live but also a sound financial investment. It can continue to be representative of the original forest of southwestern Indiana."

Miss Sawyer is one of 40 winners in the nation-wide Seventh Annual Science Talent Search.

Science News Letter, February 21, 1948

PSYCHOLOGY

Clearer Voice on Phone

► THE noise of escaping steam heard in one ear makes it easier to hear conversation over the telephone with the other ear.

You might think that the two noises would mix in your head making the speech unintelligible, or that the "Sh-h-h" noise would drown out what was being said.

But tests conducted at the Harvard University Psycho-Acoustic Laboratory by Dr. James P. Egan, now at the University of Wisconsin, showed that if the noise is kept at a moderate level of loudness it actually makes the speech heard with the other ear seem both louder and more distinct.

Listeners said, "When the noise comes on, it sounds as if the talker raises his voice in order to make himself heard above the noise," or that the speech sounded more "crisp."

Not only does the speech sound louder when the noise first reaches the other ear, but it continues to appear louder even after the noise has been turned off for a while. And the effect does not wear off after repeated exposures to the noise.

Dr. Egan gives two possible explanations of the odd experience. It is possible, he suggests, that the noise in the opposite ear has an effect on the muscles of the middle ear of the telephone ear. This theory fits in with the observation that the apparent loudness of the speech fades slowly back to normal after the noise is turned off.

The other explanation is based on certain observations regarding judg-

ments of loudness. If you hear exactly the same note with both ears, it seems louder than the same sound does with either ear alone. But if the notes or sounds are very different, then the two do not add up to make a louder sound. The extent to which the two sounds add up depends upon the similarity in frequency of the two sounds.

The reason why the "Sh-h-h" noise like escaping steam makes speech sound louder in the other ear might be because there is some similarity between the noise and the voice which, in the case of the tests, was reading Adam Smith's "Wealth of Nations."

Details of the experiments are published in the *Journal of the Acoustical Society of America* (Jan.).

Science News Letter, February 21, 1948

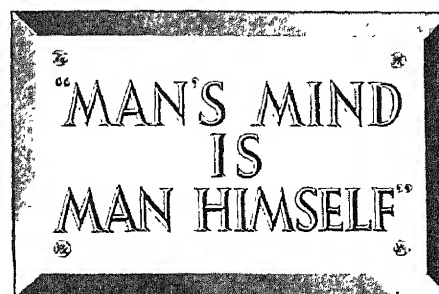
CHEMISTRY

Hair Shampoo Being Made From Sub-Standard Coffee

► HAIR SHAMPOO is now being manufactured from sub-standard and other coffee which cannot be used for beverage purposes. Other products developed to utilize coffee that would normally be wasted are scheduled to be introduced later in the year.

The oils, glycerized materials and tannic acid contained in coffee beans form the basic ingredients in the new shampoo produced by Coffette Products, Inc., Brooklyn, N. Y. These natural raw materials, with no alcohol or harsh chemicals added, are said to give the shampoo unique qualities.

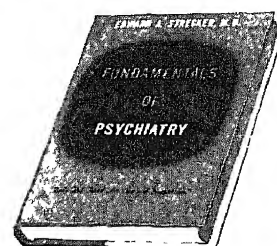
Science News Letter, February 21, 1948



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Statesmen-Scientists

➤ WASHINGTON'S birthday is always an occasion for comparing the stature of present-day statesmen and politicians with that of our first President and the men who worked with him during the first difficult days of our republic. As a rule, the moderns come off second best, even in the fields of law, economics and public affairs, for which most of them are specifically trained.

However, there is one field in which such comparisons between the Founding Fathers and public men of today are rarely made. Among our earlier statesmen it was nothing uncommon to find good knowledge of the sciences of their day, despite relatively poor facilities for dissemination of such knowledge. But scientific training among present-day makers of public policy has become so rare that its lack is simply taken for granted. We apparently are willing to entrust decisions on such immensely important scientific questions as atomic energy, soil conservation, public health and mineral resources to lawyers, bank-

ers, businessmen and newspaper editors who "never took any science" when they were in college and who certainly haven't taken any since.

Yet our Founding Fathers made themselves masters of the science of their day simply as a part of what a decently educated man was expected to know—and most of them got their knowledge without benefit of college degrees, at that. Washington had no agricultural college to attend, yet he became one of the most advanced agriculturists of his day; he never even heard of an Institute of Technology, yet he was a good practical civil engineer, and some military historians declare that he thought out his military measures along engineering lines.

Franklin never even finished elementary school, yet he became one of

the most versatile and brilliant scientists of his century, more than holding his own in an intellectual French royal court and being elected to membership in the Imperial Russian Academy of Science. Patrick Henry was perhaps as much of a professional politician as the times produced, yet had some well-grounded views on such things as soil erosion. Jefferson's interest and activity in scientific fields are a familiar classic of American history.

Latterly Congress has come to some realization of its lacks in scientific and technical knowledge and has attempted to remedy them by arranging for a corps of advising specialists. That will help, but it is not enough. There is no outside substitute for knowledge inside your own head.

Science News Letter, February 21, 1948

MEDICINE

Whooping Cough Remedy

➤ FIRST trials in patients of a new penicillin-like remedy active against whooping cough are reported by Dr. P. N. Swift of the County Hospital, Farnborough, in the *Lancet*, (Jan. 24), British medical journal.

The 10 little patients, whose ages ranged from one month to two and one-half years, all showed a definite response within the first 48 hours. Two of the 10 died. In both of these the drug seemed to control the disease, and the whooping cough was not considered the direct cause of the deaths. The other eight recovered, the speed with which they got well depending on how early in the disease the new drug was started.

Aerosporin is the name of the new drug which may turn out to be a remedy for typhoid fever as well as for whooping cough. While penicillin comes from a mold, aerosporin comes from a bacterium found in soil and air and in the tap water in an American city, Chicago. It was discovered by Drs. G. C. Ainsworth, Annie M. Brown and G. Brownlee of the Wellcome Physiological Research Laboratories.

Aerosporin is "more discriminating" than streptomycin, test-tube studies reported by Drs. Brownlee and S. R. M. Bushby show. It has no action against the tuberculosis germ. But for germs against which it is active, it is 10 to many hundred times more powerful than streptomycin.

The new antibiotic, as this kind of remedy is called, does not merely check germs but kills them. It has the further

advantage that disease germs do not readily grow resistant to it.

It cannot be given by mouth, because it is not absorbed from the stomach or intestines. It is more acutely toxic than streptomycin but its greater anti-germ activity gives it a large margin of safety. A kidney-damaging effect was gotten rid of as the drug was further purified. Aerosporin is not yet available commercially.

Science News Letter, February 21, 1948

ASTRONOMY

Cluster of Six Galaxies Found Extremely Dense

➤ A GROUP of six galaxies in the constellation of Serpens, the serpent, has been found to be at least 200 times more dense than the most crowded cluster of galaxies previously known.

The brightest member of this Serpens sextet, Dr. Carl K. Seyfert of Vanderbilt University announced, has an intrinsic total brightness as great as that of the nearby Spiral Galaxy in the constellation of Andromeda, which most astronomers believe to be quite similar to our own. The star density of this and the other five galaxies in the cluster thus becomes very high, for the brightness of stars depend on their masses.

In the entire survey, made with photographs taken with the Schmidt telescope of Harvard College Observatory, Dr. Seyfert found approximately 5,000 new galaxies.

Science News Letter, February 21, 1948

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AIR PASSENGER TRAFFIC—William L. Grossman—*Chemical Publishing Co.*, 205 p., illus., \$4.00. Especially for airline employees.

AIR TRANSPORTATION—*Association of American Railroads*, 127 p., illus., paper, free from Association of American Railroads, Transportation Building, Washington 6, D. C. Report of Subcommittee on Air Transport of the Railroad Committee for the Study of Transportation.

THE ARTIFACTS OF UAXACTUN, GUATEMALA—A. V. Kidder—*Carnegie Institution of Washington*, 76 p., 87 pl., paper \$2.15, cloth \$2.80.

BETTER WAYS OF GROWING UP—Psychology and Mental Hygiene for Youth—John E. Crawford and Luther E. Woodward—*Muhlenberg*, 270 p., illus., \$3.00. Written for boys and girls to answer their questions and providing self-quizzes to raise questions.

CALCULUS AND ITS APPLICATIONS—Raymond D. Douglass and Samuel D. Zeldin—*Prentice-Hall*, 568 p., \$5.15. A short course for engineering and science students.

DANGEROUS WORDS: A guide to the Law of Libel—Philip Wittenberg—*Columbia University Press*, 335 p., \$5.00.

DESERTS ON THE MARCH—Paul B. Sears—*University of Oklahoma Press*, rev. ed., 178 p., \$2.75. A new opportunity to read this story of how America's wealth is disappearing under our feet.

DWARF FRUIT TREES—Lawrence Southwick—*Macmillan*, 126 p., illus., 2.50. How to select and care for your own trees.

EXCAVATIONS AT KAMINALJUYU, GUATEMALA—Alfred V. Kidder, Jesse D. Jennings, and Edwin M. Shook—*Carnegie Institution of Washington*, 284 p., 207 pl., paper, \$7.00, cloth \$8.00. For those interested in archaeology and indigenous art.

THE HEATHENS—Primitive Man and His Religions—William Howells—*Doubleday*, 306 p., illus., \$3.75. The author, an anthropologist, has found "that there is hardly a limit to what the human mind can fancy, but also that there are certain typical forms in religion."

HEATING AND VENTILATING'S ENGINEERING DATABOOK—Clifford Strock—*Industrial Press*, 570 p., illus., \$7.00. A tremendous amount of useful information for engineers, architects, builders and others.

AN INTRODUCTION TO CHROMATOGRAPHY—Trevor Illtyd Williams—*Chemical Publishing Co.*, 100 p., illus., \$4.00. A British text.

AN INTRODUCTION TO ORGANIC CHEMISTRY—Ira D. Garard—*Wiley*, 3d ed., 396 p., illus., \$3.50. Intended not only for prospective chemists, but for students in many other fields.

LABORATORY HANDBOOK FOR GENERAL CHEMISTRY—Roland M. Whittaker and Alexander P. Marion—*Chemical Publishing Co.*, 363 p., illus., paper, \$4.50. With ring binder.

MODERN CEREAL CHEMISTRY—D. W. Kent-Jones and A. J. Amos—*Northern Publishing Co.*, 4th ed., 651 p., illus., \$15.00. Information for the cereal chemist and those who have to do with the use of grains.

MOST-OFTEN-NEEDED F.M. AND TELEVISION SERVICING INFORMATION—M. N. Beitman—*Supreme Publications*, 192 p., illus., paper, \$2.00.

NEW TERMINOLOGY AND THE INDEX-CATALOGUE—Clausius F. Mayer—20 p., paper, free from the author, 5513 39th St., N. W., Washington, D. C. A paper presented at the Symposium on Medical Subject-Headings.

OPIATE ADDICTION—Alfred R. Lindesmith—*Principia*, 238 p., \$3.00. A sociologist discusses the nature of drug addiction and what it means as a social problem.

OUT OF THIS WORLD: Anesthetics and What They Do To You—Sylvan M. Shane—*Creative Age Press*, 110 p., illus., \$2.00. A director of anesthesiology writes to inform and reassure the patient.

PROTEINS AND AMINO ACIDS IN NUTRITION—Melville Sahyun, ed.—*Reinhold*, 566 p., illus., \$7.50. Discussions by workers in many specialized fields.

SHOOT THAT NEEDLE STRAIGHT—Robert Rantoul—*Bruce Humphries*, 220 p., illus., \$2.75. A lightly written story of the experiences of a diabetic.

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SURFACE CHEMISTRY FOR INDUSTRIAL RESEARCH—J. J. Bikerman—*Academic Press*, 464 p., illus., \$8.00. Especially for those in industry who are interested in the why of what is being done there.

THE SYSTEMATIC IDENTIFICATION OF ORGANIC COMPOUNDS—A Laboratory Manual—Ralph L. Shriner and Reynold C. Fuson—*Wiley*, 3d ed., 370 p., illus., \$4.00.

WEATHERWISE, Vol. 1, No. 1—Charles A. Federer, Jr., Ed.—*Amateur Weathermen of America*—20 p., illus., \$3.00 a year. A new magazine for those interested in weather.

Science News Letter, February 21, 1948

CHEMISTRY

Boy Extracts Gold from Sea Water by Own Method

➤ GOLD from sea water, the dream of modern chemists as transmutation was of ancient alchemists, has been realized on a laboratory scale by George Camamis, 17, a senior at New Brunswick High School, New Brunswick, N. J. He used a method of his own devising for the extraction.

He made several gallons of sea water highly acid with hydrochloric, and added a gram of barium chloride. This produced a precipitate, which he allowed to settle for several days, then decanted the

clear water above the precipitate into another vessel.

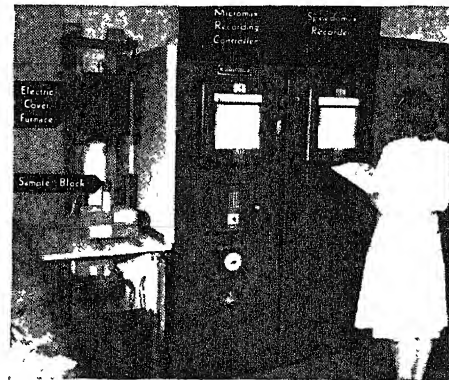
After neutralizing this water with sodium hydroxide and adding a very small quantity of barium chloride he obtained another precipitate, which again was allowed to settle for several days. Then he collected the precipitate, washed it with distilled water and dried it. This precipitate was supposed to contain the gold, in the form of a salt, barium aurate.

After drying the precipitate, he heated it with a blowpipe on a charcoal block, together with lead and borax. A glass bead resulted, in which a minute quantity of free gold was expected to be present.

Crushing the bead to a fine powder, he added mercury to pick up the gold and form an amalgam. Then he evaporated the mercury. A thin film of gold was left behind in his crucible.

Mr. Camamis reported his unique experiment in an essay submitted along with other qualifications that have won him a place among 40 winners of all-expense trips to Washington, D. C., to take part in the annual Science Talent Institute.

Science News Letter, February 21, 1948



Interested in Differential Thermal Analyses?*

Speedomax records thermal reactions in six clay samples during one furnace heat; thereby saves the scientist's time. It also permits quick, accurate analyses of results, because six records are on one chart.

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* Kulp, J. L., Kerr, P. F., *Science*, Vol. 105, p. 413, 1947.

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Science News Letter, February 21, 1948

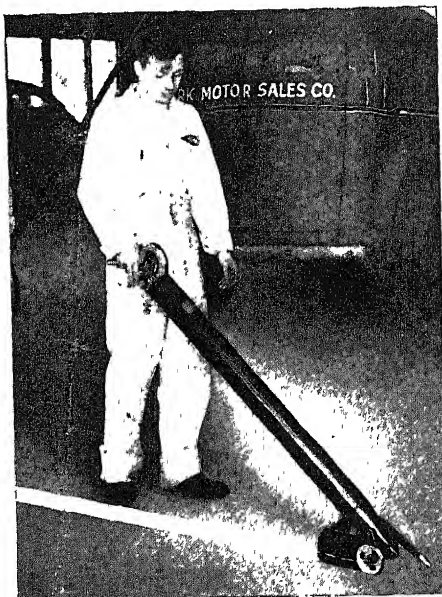
⚙️ **WAFFLE COOKER**, for the boarding house or restaurant, is a small oven-like device that cooks six waffles at a time. Additional units give it greater capacity. It is fed by automatic batter dispenser, and the waffles, each in its own drawer-like compartment, can be removed individually.

Science News Letter, February 21, 1948

⚙️ **SUPERSONIC ENERGY** generator, which delivers sound waves too high-pitched for the human ear to hear, is a single-frequency device which operates on any 110-volt alternating current line and produces vibrations of 400-kilocycle frequency. Such energy has many laboratory and industrial uses, including killing bacteria in milk.

Science News Letter, February 21, 1948

⚙️ **PAINT-LINE** marker for use in garages and factories makes neat two- to four-inch lines at a walking pace, and either straight or in curves. The handle



of the device, shown in the picture, holds six quarts of paint which is released by a finger-grip trigger.

Science News Letter, February 21, 1948

⚙️ **BONDING AGENT** to hold mortar to glass blocks in construction work is a rubbery material that expands with the mortar and the glass without rupturing the film. It can be applied with a caulking gun, or thinned down with a suitable solvent and applied by brush.

Science News Letter, February 21, 1948

⚙️ **TEMPERATURE CONTROL** for chicken brooders, an improved type, has a seamless bellows which contracts and expands indefinitely with temperature changes because it has no soldered joints to open up under use. The expansion and contraction of the bellows operates the temperature control mechanism.

Science News Letter, February 21, 1948

⚙️ **PHOTOMICROGRAPHIC LAMP** uses the war-developed zirconium concentrated-arc, claimed to be the closest approach yet attained to a point source of light. The lamp has a seven-lens system which enables an operator to get photomicrographs of high quality.

Science News Letter, February 21, 1948

NEW CHARTS OF THE CHEMICAL ELEMENTS

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Question Box

ASTRONOMY

What comet will soon be seen in the Northern Hemisphere? p. 116.

ENGINEERING

What is responsible for the present shortage in fuel oil? p. 122.

GENERAL SCIENCE

In what legal tangle do America's greatest scientists find themselves? p. 118.

MEDICINE

How can death from cancer in young children be reduced? p. 119.

In what disease has Vitamin E been found to relieve pain? p. 119.

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What new remedy is being tried against whooping cough? p. 126.

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PSYCHOLOGY

How does the sound of escaping steam affect hearing? p. 125.

PUBLIC HEALTH

Who has been appointed new Surgeon General for the U. S. Public Health Service? p. 115.

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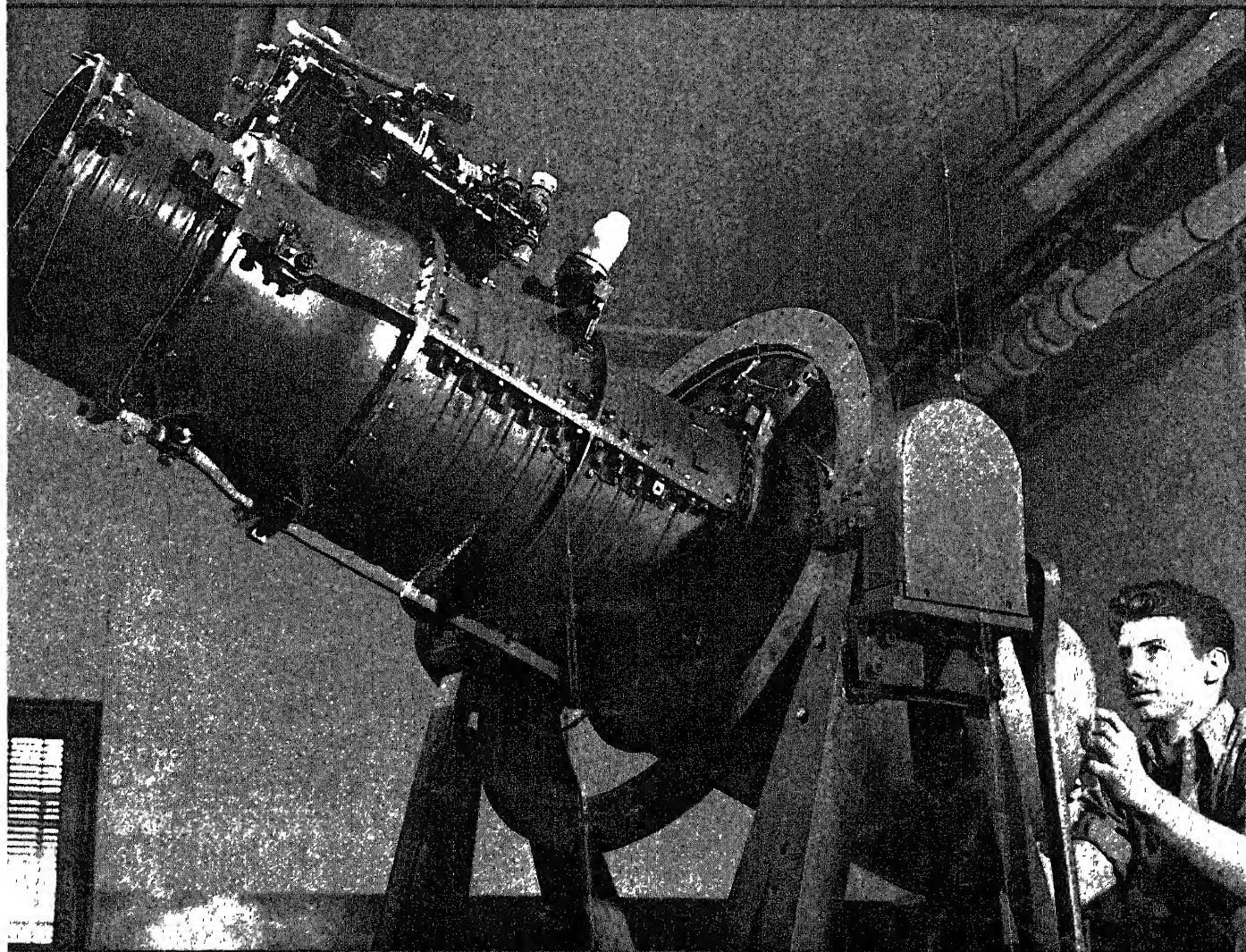
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SCIENCE NEWS LETTER

Vol. 13, No. 9

THE WEEKLY SUMMARY OF CURRENT SCIENCE • FEB. 28, 1948

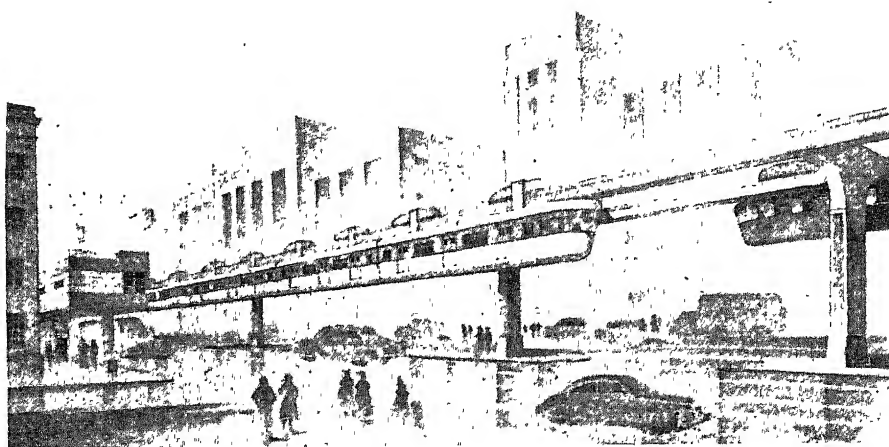


Jet Power

See Page 136

A SCIENCE SERVICE PUBLICATION

Editorial Address: Science Service, Washington, D.C.



SUSPENDED ELEVATED TRAINS—This is an engineer's concept of what overhead passenger cars will look like. A new company has just been incorporated in New York to install this system which, they hope, holds the answer to congested traffic in cities.

ENGINEERING

Avoiding Traffic Tie-Ups

Claimed advantages of the proposed suspended monorail trains are low cost, rapid construction and high speed of operation.

► **OVERHEAD** passenger cars, running suspended from a single track, were proposed as a solution for city street traffic congestion at the N. Y. Railroad Club meeting in New York by Edward H. Anson.

The idea is not new or untried. An eight-mile route, with trains of from two to five cars, has been in use in Germany since 1901. The present proposal is for a vastly improved design over the German system.

A business organization to install this system, which is known as suspended monorail rapid transit, has just been incorporated in New York. Mr. Anson is vice-president of Gibbs & Hill, Inc., consulting engineers to the new company, Monorailway Corporation. The incorporation follows many years of intensive research in the fields of transportation, engineering and manufacturing.

Low cost, in comparison with conventional elevated railroads and subways, is one of the advantages of the suspended monorail system. It can be constructed more rapidly than other comparable systems, and scheduled speeds of operation are as high as any available rapid

transit rendering the same service.

Monorail operation is quieter than other systems, and its appearance can be made attractive. The design for the supporting structure provides either an arch or a single, T-shaped column, with cantilever arms, each carrying a simple box girder on which the rails are placed. The structure does not darken the street below as in the case of the ordinary elevated railway construction.

The cars used with the system resemble ordinary passenger coaches but each has two overhead trucks to follow the rail. They are about 48 feet long, a little over nine feet in width, and weigh 15,000 pounds. They seat 48 passengers. Their center of gravity is directly below the center line of the rail. Due to this fact the car tends to restore itself to normal position if caused to swing for any reason.

The monorail system is suitable for interurban transportation as well as for use within urban areas. Speeds of 100 miles an hour are entirely possible, Mr. Anson declared. It offers a more comfortable and pleasant service to passengers than other systems, he said.

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SOCIOLOGY

Urbanized States Found To Have Low Crime Rate

► **COUNTRY FOLKS** no longer need to fear the "wickedness" of the cities. Recent statistics show that states with the most city dwellers have less crime than do their country cousins.

This is one of the facts disclosed by a 10-year survey of crime reported by Dr. Austin L. Porterfield of Texas Christian University, Fort Worth, Texas.

Crime declined during the war in a majority of the states. Dr. Porterfield has a simple explanation for that—a great many men of crime-committing age had gone to war. When they returned the crime rate in those states started climbing again.

But some parts of the country had more crime during the war than they did before. This seems to have been due to the huge influx of outside populations into war-industrialized areas. Crime among these "displaced" civilians was greater than was normal for the region.

Types of crime, as well as amount of crime, vary in different parts of the country. Illinois and California were found to be strong for robbery, both before the war and later. Louisiana and North Carolina, in contrast, had relatively few crimes of this type. But Louisiana and North Carolina had lots of murders and aggravated assault, the figures indicate, whereas Illinois and California did not have so much violence of this kind.

The difference, Dr. Porterfield believes, depends on the culture and also on circumstances. No one robs banks, he points out, where there are no banks to rob and shoplifting depends on the presence of shops.

But Dr. Porterfield does not believe that the Negro can be blamed for the high crime rate in some parts of the South. He is not responsible, Dr. Porterfield says, for the high rates of auto theft in the South; he does not specialize in this kind of crime. And neither does the Negro have a monopoly on crimes of violence.

In general, Dr. Porterfield concludes, crime is less where people are well off, socially and financially. And it is because the states where the social well-being is greatest are also the most "citized" that crime rates tend to be lower in the more urbanized parts of the country.

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BACTERIOLOGY

Humidity Kills Germs

Air-borne disease germs could be checked in schools, offices and theaters by a relative humidity of 50%, which seems to be lethal.

➤ A RELATIVE humidity of 50% swiftly kills disease germs in the air.

This discovery by Edward W. Dunklin and Dr. Theodore T. Puck of the University of Chicago may give us a new, simple way of stopping the spread of diseases like pneumonia, colds, 'flu and others whose germs spread through the air.

It may also explain why such diseases spread rapidly at some seasons and not at others. It might give scientific evidence for the phrase, "pneumonia weather," used by our grandmothers.

The discovery was made in studies with Type I pneumonia germs, staphylococci and streptococci, the latter the cause of serious sore throats, scarlet fever and other ailments. Whether viruses and other disease germs are similarly affected has not yet been determined. But using humidity, in schools, offices, theaters and the like, to check the spread of disease would be so simple that it would be worth while even if only partly beneficial, as the scientists point out.

The humidifying would have to be done exactly. A 50% relative humidity is rapidly lethal to the germs studied but they can survive a long time at higher and lower relative humidities.

At 50% relative humidity the pneumonia germs the scientists sprayed into an experimental air chamber were all dead in less than 10 minutes. But at relative humidities of 80% and 20% many germs survived for over two hours.

The 50% relative humidity that is deadly to germs would not be uncomfortable for humans indoors. Climatologists have found that whether the air is wet, dry or humid makes very little difference in comfort so long as the temperature ranges between 50 and 68 degrees Fahrenheit. That upper temperature level and the approximately 72 degrees Fahrenheit temperature of the studies with germs are fairly close to each other and to the usual indoor temperatures. Temperatures in the fifties and nineties make a difference in the germ-killing effect of humidity.

The 50% relative humidity kills the germs by dehydrating them to the point

where they become most vulnerable to the action of sodium chloride, the ordinary salt we use for seasoning food. When the germs were suspended in distilled water, instead of broth, and then sprayed into the air, they did not die as fast at 50% relative humidity. But

when sprayed from a salt solution, or from human saliva, which is the natural way they get into the air, they were rapidly killed, just as when sprayed from broth.

Measurement of the rate of settling of droplets showed that the disappearance of the germs from the air at 50% relative humidity was a true killing process and not a sign of collision of germs with the sides of the air chamber or with each other.

Details of the experiment are reported in the *Journal of Experimental Medicine* (Feb. 1).

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NUCLEAR PHYSICS

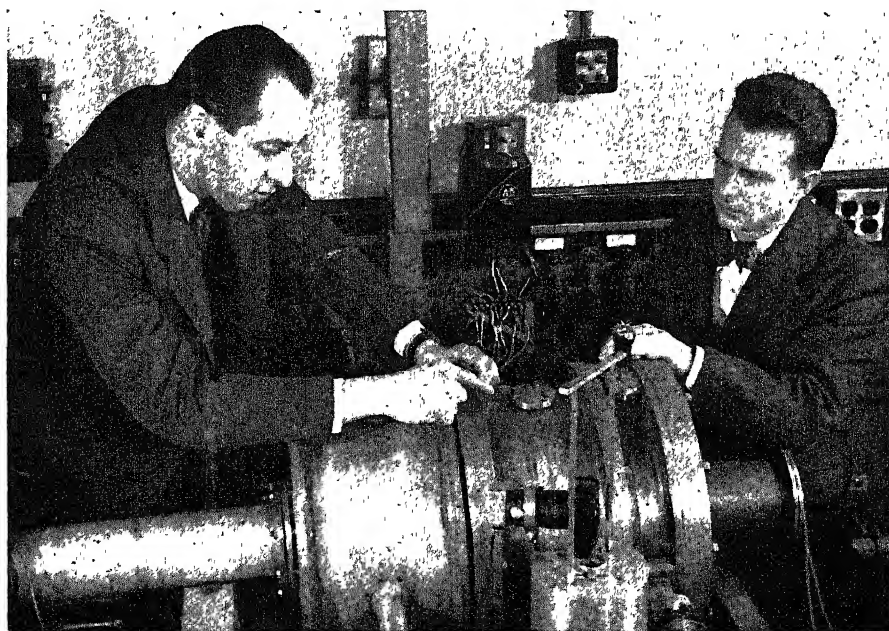
Attack Atomic Secrets

➤ ROUND, hollow "pill boxes" are at the heart of a new, powerful atom-smasher which has been constructed at Yale University, New Haven, Conn.

The pill boxes are three to seven inches long and weigh approximately 75 pounds. Connected up into what is called a cavity resonator, with high powered amplifiers, the pill boxes will generate an electrical voltage equal to approximately 2,000,000 volts each.

This system, known as a linear accelerator, has already attained 1,000,000 volts. Electrons, light-weight negatively charged atomic particles, are built up to the speed of light to smash the nuclei of atoms in the new effort to unlock atomic secrets.

Yale's linear accelerator was constructed under the direction of Howard L. Schultz, assistant professor of physics, in collaboration with Edward R. Ber-



NEW ATOM-SMASHING ACCELERATOR—"Pill boxes," on the average generating an electrical voltage equal to approximately two million volts each, are at the heart of a new linear accelerator at Yale. It was constructed under the direction of Howard L. Schultz, assistant professor of physics, shown in the picture explaining the system to Carol G. Montgomery, associate professor of physics.

Linlithgow Library.

inger, assistant professor of physics, and Carol G. Montgomery, associate professor of physics. The scientists are planning to use the new accelerator to study four major problems:

1. A study of new products produced by nuclear transmutations which convert one element into another.

2. How a fast electron behaves near the nucleus of an atom, and how an electron gets out of the nucleus.

3. Production of powerful X-rays by stopping fast electrons suddenly.

4. How are fast electrons absorbed in matter.

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AERONAUTICS

Guide V-2 Rocket's Flight

➤ A NAZI-BUILT V-2 rocket with an American-made control system is the first of the much-heralded guided missiles.

The V-2 was successfully maneuvered in flight for the first time at the White Sands, N. Mex., Proving Ground. Signals radioed from the ground sent the rocket to the right and left and up and down.

Control is achieved by a device which receives the radio signals and activates the gyroscope which steers the rocket.

As developed thus far, the guided V-2 is still a far cry from the guided missiles which have been proclaimed to be the weapons of the future. But this flight marked the first known success at controlling any portion of a rocket flight from the ground. Months ago, the same system was sent on a "dry run" flight, in which radio signals were received and

sent back by the equipment in the rocket. On that flight, the rocket was not guided in its path, but the radio system was tested. The present flight was made possible by the successful testing which assured that the radio signals would be received by the equipment aboard the rocket.

Rocket experts of the Armed Forces emphasize that the V-2 flight was only a first step toward a guided missile. But they point out that the simple maneuvers are an important control development. The supersonic-speed rocket cannot be made to perform the dives and turns of a small airplane.

Whether or not the controlled V-2 will stand up as the first American guided missile is a problem for historians. Cloaked in secrecy are other missiles, some of which may be guided.

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NUCLEAR PHYSICS

A. E. C. Offers Fellowships

➤ THE urgent need for men and women equipped to fight radiation danger and to man expanding atomic energy programs has led the U. S. Atomic Energy Commission to establish fellowships for training qualified persons in atomic medicine and biology.

Selection of candidates and administration of the program will be carried out by the National Research Council, with the A. E. C. financing the program, establishing operating policies and training goals. For the first year of the program approximately \$1,000,000 has been budgeted.

The program is expected to continue for about five years. About 75 fellows each year will be physicians and doctors of philosophy in the biological sciences. Their fellowships will be for two years. In addition, the program calls for 100 fellows who are graduates of colleges or universities but without advanced de-

grees, to take one year of training in health physics.

Because the A. E. C. wants its fellows spread widely over the country, selection of universities for fellowship training will depend in part on geographical location. Fellows will have a certain amount of latitude, however, in selection of institutions for their training.

The A. E. C. will have plenty of jobs in its own installations for the men and women after their training, Dr. Shields Warren, A. E. C. interim director for medicine and biology, stated. However, fellows will not have to agree to work for the Commission.

Health and safety of atomic energy workers can be maintained, he declared, with the trained personnel for this work now on hand. But expansion of the atomic energy program will require more of these specially trained workers. And a considerable number of research

fields which should be explored cannot be at present because of the shortage of personnel.

Very important for the future world food situation, Dr. Warren and his associate, Dr. John Z. Bowers, pointed out, is the matter of using radioactive substances for improved utilization of now scarce fertilizer materials. Preliminary investigations indicate, for example, that it may not be as necessary to lime soil as has been believed. Further studies, with tagged atoms, of the uptake by plants of different types of substances may lead to better uses of fertilizers.

Finding how long an insecticide spray will hang onto a leaf may be determined

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by tagging some of the spray's atoms with radioactive isotopes. This might save the orchardist or farmer from spraying as often as he now does, or might show the need for more frequent spraying to save his crop.

Radioactive tracers, or tagged atoms, may not necessarily open up new fields,

Dr. Warren explained, but may help advance science by giving an easier method of working in older fields. As an example of this, he gave the ease with which phosphorus can be determined by the tracer technic compared with the extremely difficult and slow processes of chemical analysis for this element.

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PSYCHIATRY

Check Stammer by Shock

Girl patient can talk and even sing for the first time in 13 years after treatment with electric shock. Her condition believed to have been neurotic.

➤ A YOUNG girl who stammered so badly that she could speak only in occasional monosyllables was enabled to talk freely and even to sing as a result of treatment with electric shock at the Owen Clinic, Huntington, W. Va.

The girl, whose name is not disclosed by her physicians, has stammered since she was seven years old. She is now 20.

She had graduated from high school in spite of her severe handicap and had been able to maintain a "B" average. She also had many girl friends and enjoyed going to movies and dancing. She had few boy friends, however. She studied business subjects in high school, not because she had particular interest in commerce, but because she thought it offered her the best chance of becoming independent economically.

Treatment at the clinic was started in the usual orthodox manner. She was encouraged to relax and given continuous warm baths and helped to relax with music. But speaking continued to be a very painful experience although some improvement was noticed.

Then, because the girl was in a great hurry to learn to talk and be able to get a job, the electric shock treatment was tried. There was little change until the fourth treatment, after which the improvement was remarkable. She was given 13 treatments, the last one resulting in a mild convulsion of the type known to physicians as "petit mal." The improvement after that one was even more dramatic than after the others. She was now able to speak normally except that following a visit from her family her stammer which had been negligible became greatly accentuated.

It was found that the girl's chief interest was in nursing and she is now working as a nurse's aide. She works

almost entirely with mental patients and is extraordinarily patient with them.

Drs. Thelma V. Owen and Marguerite G. Stemmermann, in reporting the case to the *American Journal of Psychiatry*, (Dec.), say that the remarkable and immediate improvement of the girl when the electric shock treatment released her inner tension, as well as her relapse when contact with her family was trying for her, indicates that the stammering, at least in her case, was due to a neurotic condition.

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MEDICINE

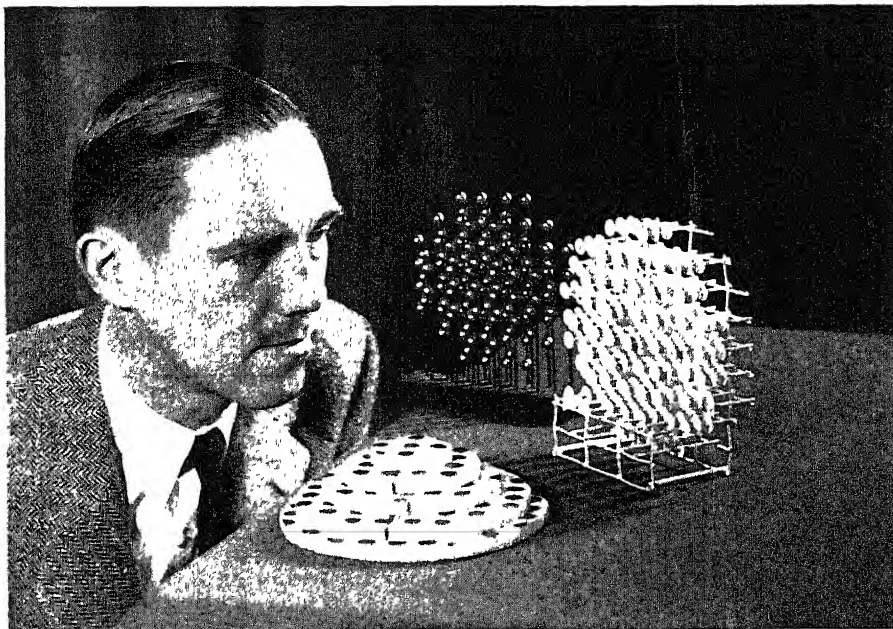
Artery Cutting Operation Relieves Severe Headache

➤ AN artery cutting operation that gives relief in almost nine out of 10 (87%) of severe headaches is reported by Dr. Walter G. Haynes of Birmingham in the *Journal of the American Medical Association* (Feb. 21).

The headache is a one-sided, paroxysmal pain that radiates into the eye and sometimes is associated with reddening and tearing of the eye. The temporal artery that runs up the side of the head in front of the ear is tender at the time of the headache. Injection of a local anesthetic, procaine, around the artery relieves the headache. The pain is so severe as to be incapacitating. Some patients had attacks two and three times a week.

Cutting out a piece of artery relieves the pain immediately and apparently permanently. In some cases nerve is also torn loose. Nerve fibers crossing the artery are, Dr. Haynes believes, responsible for carrying the pain to the head. In some cases the middle meningeal artery is cut as well as the temporal artery.

The operation when done by a trained



NEW TYPE METAL LENS—It will be used for focussing radio waves in radio relay systems in the way an optical lens focusses light. It is theoretically capable of handling from 50 to 100 television channels or tens of thousands of simultaneous telephone messages, in the proposed radio relay link the Bell System is planning between New York and Chicago. Shown with three different small-scale models of the lens is Dr. Winston E. Kock who developed them.

surgeon is not dangerous. It is done under local anesthetic and the patient usually need not stay in the hospital more than three days.

Dr. Haynes advises this operation for these one-sided headaches when conservative treatment, such as by drugs, X-rays and traction on the neck, fail

to give relief. Patients sometimes have headaches after the operation, but in such cases medicines, sometimes ordinary headache remedies, relieve the pain.

In a series of 47 patients the operation gave relief in 87%. Conservative treatment brought relief in only 32% of 25 patients.

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RADIO-ASTRONOMY

Cosmic Static Jams Radio

➤ RADIO noises broadcast from the sun and stars cause picture jumpiness and streaking to appear on television, and can drown out FM broadcasting stations, Grote Reber, radio physicist at the National Bureau of Standards, declared.

Mr. Reber discussed cosmic radio sounds as the guest of Watson Davis, director of Science Service, on the Adventures in Science program heard over the Columbia network.

"Cosmic noise from the Milky Way is undoubtedly one of the major factors limiting the distance that FM and television can transmit," said Mr. Reber.

Cosmic static also affects other high frequency equipment such as certain types of radar and aircraft safety instruments. He added that this static doesn't affect the ordinary radio in our homes. This is because the lower frequencies of the cosmic noise which would disturb the standard broadcast band cannot reach the surface of the earth through the ionosphere, an upper layer of the earth's atmosphere.

"Cosmic static begins to interfere on frequencies above 15 megacycles, and begins to slope off above 100 megacycles," Mr. Reber explained. "However, it is at this point that solar static starts to come in."

Static from the stars was first noticed and picked up in 1932, and this was when Mr. Reber began his own study on this subject. In his home town in Illinois, he set up his equipment. A big saucer, 30 feet in diameter, captured the signals from outer space, where they were absorbed by a drum, then transmitted down to a meter which registered the intensity of received radiation. It looked like a giant mushroom, Mr. Reber recalled.

"People there got so used to seeing my equipment that I could always spot strangers in town by the fact that they'd stop to take a look," Mr. Reber said. He added to the equipment, using

his own money, and worked in the quiet hours of the night when there was less disturbance from passing automobiles.

The project became too big to handle alone, and with the rush to higher frequencies, the results began to have real practical importance. Mr. Reber joined the staff of the Bureau of Standards. His equipment was moved to Virginia and will receive broadcasts from the Milky Way. A set of German Giant Wurzburgs, a radar brought back from Germany, receives broadcasts from the sun.

Next steps are to attempt to pin-point the sources of the two types of static and to study their frequencies and variations. Mr. Reber believes there is the possibility that these radio noises could be used to make an analysis of outer space.

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RADIO

Broadcasting Unit Is Size of Fifty-Cent Piece

➤ LATEST version of the business tycoon who started "on a shoestring" may be the radio station owner of the future who starts on a half dollar. The "half-dollar radio station" was demonstrated to the local section of the Institute of Radio Engineers in Washington by Dr. Clelio Brunetti, engineer at the National Bureau of Standards.

Dr. Brunetti is the man who carries a whole "network" of radio broadcasting transmitters around in his pockets. He built a radio transmitter which fits conveniently in an empty lipstick container. His "calling card radio" is on a thin plastic card the size of a calling card. And the half-dollar broadcasting unit is on a square which would barely cover a 50-cent piece.

The thin plastic square measures one and one-quarter inches each way. Flat painted lines form the circuits instead of

the wires which are in your radio. Tiny tubes are soldered to the flat surface. Small batteries such as are used in hearing aids supply the power for the sub-miniature station.

But the engineer is even more proud of one of his larger models, a vest-pocket transmitter and receiver which is a duplicate of one Dr. Brunetti presented to President Truman.

If you are looking forward to the day when you will be able to get one of these tiny radios, the National Bureau of Standards has good news for you. A recent survey revealed that more than 65 manufacturers have already begun to use printed circuit techniques in some of their products. So far, these flat, smaller circuits are not finding their way into many radios, but many manufacturers are working on this problem.

At least one hearing aid is now using the printed circuits and plans for two-way personal radios have been announced. When the latter gets on the market, they may find some unique uses. Dr. Brunetti showed the radio engineering group how a large store might use the midget transmitters for a routine inventory. One clerk could count the stock, broadcasting the figures to an office where they would be recorded and tabulated. The idea for this use of the tiny radios came to the Bureau of Standards from an executive of a large chain store.

The Bureau worked on printed circuits for the wartime proximity fuze. Since the war Dr. Brunetti and his staff have shown how these circuits can be used in industry and perhaps one day in your own pocket or handbag.

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ASTRONOMY-GEOGRAPHY

Solar Eclipse to Help Accurate Mapping of Earth

➤ THE shape and size of the earth will be determined with greater accuracy than ever before when the moon comes between the earth and the sun on May 8-9.

A multiple expedition to Burma, Siam, China, Japan, Korea and the Aleutian Islands, all along the path of the eclipse, is being planned by the National Geographic Society. Simultaneous observations to be made at these points will aid in making better maps of the earth.

Because the path of the eclipse crosses the International Date Line in mid-

Pacific, it will occur on two days. Instead of being a total eclipse, it will be an annular one with the moon appearing slightly smaller than the sun and thus at maximum being surrounded by a narrow ring of light.

The exact time when the moon's edge first touches the sun, when the ring of light first shows around the moon, when the ring disappears as the moon moves on and when the edges of the sun and moon part company, all four will be accurately clocked. These contacts will come at different times at the various observing stations along the eclipse path.

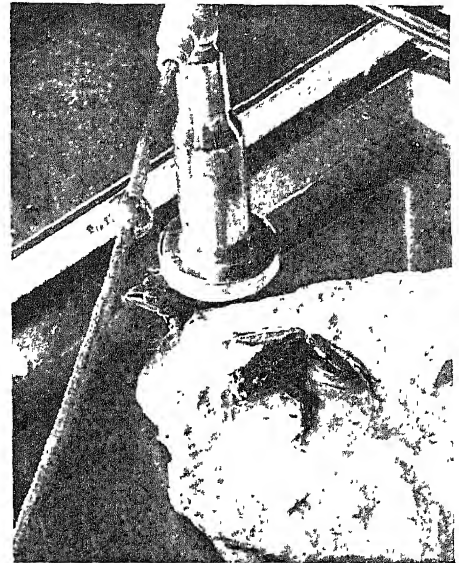
The difference in time of contacts as measured at any two stations makes it possible to calculate with great accuracy the distance between these two stations, and to locate their relative positions on the earth's surface with an

error of not more than 150 feet. This helps determine very exactly the shape and size of the earth.

Measurements of the times of contact of the sun and moon will be made by photographing the eclipse on 35-millimeter sound motion picture film. The one-per-second ticks of a chronometer, checked for accuracy with radio time signals, will be recorded on the sound track. A comparison of the eclipse contact pictures with the time marks on the sound track alongside them will permanently record the exact moment of the contacts.

The U. S. Army's Map Service, Engineers and Signal Corps, the Navy, Air Force, Bureau of Standards, Coast and Geodetic Survey and State Department are cooperating with the Society in the project.

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RADIOACTIVE FROGS—Visitors to the Atomic Energy exhibit at the Museum of Science and Industry in Chicago have the privilege of operating a detector probe which turns on blue, green and red lights as the "hot" or radioactive frogs are approached. This dramatizes for the layman the use of radioactive substances employed as "tracers" in the fields of biology and preventive medicine.

MEDICINE

Conflict Root of Illness

Patient described as filibustering in the doctor's office in an unconscious attempt to hide the root of his illness, which is body's reaction to mental conflict.

➤ **FILIBUSTERING** is a medical symptom, says Dr. Andrew D. Hart, of the University of Virginia School of Medicine.

The filibustering he described is that done by patients in doctors' offices, not the Senatorial variety.

He lists it with other symptoms of psychosomatic illness in a report to the *Journal of the American Medical Association* (Jan. 24).

The patient who filibusters is doing it in an unconscious attempt to keep the doctor from finding out what is really causing the illness. Dr. Hart gives as an example a 50-year-old woman confined to a wheel chair with deforming arthritis, or rheumatism. For the five years she had been rheumatic, she successfully resisted efforts to start proper treatment of her symptoms.

Each time she saw the doctor, she took up the entire time with an exhaustive account of her numerous symptoms and feelings, or would get onto discussions of politics and what her family and friends were like and what they said. Every time the doctor tried to steer the interview back to what things in her life or personality might account for the arthritis the patient got off onto another

subject and did some more filibustering.

Patients with stomach ulcers, heart disease, overweight and headaches may do the same thing, if their physical symptoms and illness are psychosomatic. The psychosomatic illness, Dr. Hart explains, is the body's reaction to mental conflict so severe that it has to be repressed. Unconsciously the patient feels that even painful, disabling physical symptoms are not as bad as the conflict of feelings he is repressing. So, though he consciously wants to feel better, he unconsciously resists efforts to get at the cause of his troubles.

Procrastination in seeking treatment, self-treatment, "medical shopping," sabotage of treatment and patronizing medical cults are other symptoms Dr. Hart says will help diagnose psychosomatic illness.

Science News Letter, February 28, 1948

MEDICINE

New Test for Pregnancy Utilizes Common Frogs

➤ **MALE** frogs of the commonest American species can now be used as test animals in detecting early pregnancy in women. They will be used in place

of the much more costly tropical frogs and toads recently recommended and the mice used in the first technique of the kind to be described, known as the Ascheim-Zondek test.

The new test is described by a Columbus physician, Dr. P. B. Wiltberger, and Prof. D. F. Miller of the Ohio State University, in *Science*, (Feb. 20). A small quantity of urine from the patient is injected into the body of a male leopard frog. If she is pregnant, the frog begins to discharge his male sex cells in from two to four hours.

For the sake of certainty, Dr. Wiltberger recommends the use of two or more frogs for each test. This does not involve any appreciable extra expense, partly because the frogs are so abundant and easy to obtain in the first place, partly because the same frogs can be used again and again, with four- to five-day intervals between tests.

The leopard frog is the species known to zoologists as *Rana pipiens*. It is the first animal students are given to dissect in beginning zoology courses.

Science News Letter, February 28, 1948

WILDLIFE

U. S. Handling of Seal Herd Studied by Uruguayan

► URUGUAY possesses the only surviving fur seal herd in the South Atlantic, and for this reason that country's Fisheries Service has had one of its young biologists, Dr. Raul Vas-Ferreira, journey to the far-off Pribilof islands in the Bering sea, to study American methods of management of the great seal herd there. Dr. Vas-Ferreira is now in Washington, completing his studies at the U. S. Fish and Wildlife Service and the National Museum.

The Uruguayan fur seal herd has its shore bases on three groups of small islands off the coast: Lobos, Polonio and Coronilla. Its numbers are not accurately known; Dr. Vas-Ferreira states that estimates vary from 20,000 to 50,000 animals. These, with a few more on islands in the South Pacific area, are the sole survivors of the once numerous herds that were practically exterminated by American and British sealers a century and more ago.

In addition to the fur seals there are on the Uruguayan islands about 10,000 sea lions, and smaller numbers of Antarctic species of seal, as well as a few sea elephants. Numbers of penguins come up from the south every year, drifting on the Falkland current; but they cannot stand the hot summers and invariably die.

No pelts are taken at present from the Uruguayan seal herd, but after Dr. Vas-Ferreira's results have been evaluated and applied, systematic harvesting will begin. The pelts will be sent to this country, to be marketed in St. Louis.

Science News Letter, February 28, 1948

FISHERIES

Clams May Join Oysters As Cultivated Sea Crop

► SUCCULENT softshell clams may soon join oysters as a cultivated sea-crop on tidal flats now yielding no food products, if experiments now in progress under the supervision of scientists at the Woods Hole Oceanographic Institution fulfill their present promise.

Vast areas along the North Atlantic coast that once yielded abundance of clams have been completely "clammed out," and will have to be re-colonized with seed clams if they are to be made productive again. The one town of Barnstable on Cape Cod, once famous for its softshell clams, now looks out on

more than a thousand acres of such desert clam flats.

Barnstable's Selectmen decided to do something about it. With typical New England caution, they started with an experimental 75 acres which they leased to a number of local cultivators.

A year ago about a thousand bushels of seed clams, taken from the polluted waters of Boston Harbor, were planted on these plots. The clams soon rid themselves of pollution. Snugly buried in their new home, they have already doubled in bulk, and by next year the volume is expected to be trebled. Various methods of soil improvement bid fair to speed growth and hasten the increase in number of young clams.

Science News Letter, February 28, 1948

ENGINEERING

Spinning Steel Balls Being Used to Test Paint

► STEEL balls, spinning at a speed of approximately 1,800 miles an hour, are being used to test the ability of paints to stick to a surface in a Navy project at the University of Cincinnati.

The tiny steel balls are only a quarter inch in diameter. Dots of paint are put on the balls which spin at a top speed of 2,400,000 revolutions per minute, suspended in a vacuum and driven by a rotating magnetic field. The device in which the balls spin is called an "ultra-centrifuge."

When the ball spins in the ultra-centrifuge, the dot of paint flies off. The speed at which this takes place is used to calculate the adhesive qualities of the paint under test. Dr. Walter Soller of the University's Applied Science Research Laboratory devised this paint-testing method.

Paints undergoing the centrifuge test are designed for highspeed aircraft. Aircraft paints, spread over the entire surface of the plane, add to the weight, so a light coating only one-thousandth of an inch thick is used. This thin coat tends to come off at high speeds, altering the weight and airflow of the airplane.

Chief factor in making paints stick to the surface of aircraft at high speeds is the adhesiveness, which is tested with the centrifuge.

In the future, the paint which goes on your house may be rated for adhesive qualities by this test, as the American Society of Testing Materials is studying the new method.

Science News Letter, February 28, 1948

IN SCIENCE

AERONAUTICS

Young Scientists Told of Race for Jet Supremacy

See Front Cover

► PROMISING future scientists were told of the dramatic struggle to develop jet engines by pioneer jet men from the Westinghouse laboratories, in the first day's program of the Science Talent Institute in Washington (Feb. 27) attended by 40 high school seniors from all over the country who are winners in the Seventh Annual Science Talent Search.

Revealed to these science-minded students were the intricacies of jet propulsion and gas turbines by men who "started from scratch" and built up one of the best-equipped jet laboratories in existence.

Reinout P. Kroon, manager, and Mark Benedict, both of the Engineering Department, Aviation Gas Turbine Division of the Westinghouse Electric Corporation, Philadelphia, demonstrated tiny jet racers, small ram-jets in action and the heating of metals to white heat to illustrate the metallurgical problems encountered in building jet engines.

Mr. Kroon said in his opening address that "Jet engines with enough power to push planes to twice the speed of sound—about 1200 miles per hour—will be possible in the next six years if development continues at the pace attained in the six years since America entered the international race for jet supremacy."

He added that "so rapid has American progress been in supplying ever increasing engine powers demanded by military air services, that in the time usually needed to double a conventional engine's power we have increased power four-fold."

Mr. Kroon was the leader in developing what he thought was an original model of the "axial flow" compressor for turbo-jets, until captured Nazi models showed that they had it, too.

On the cover of this week's SCIENCE NEWS LETTER is shown an assembled Westinghouse axial-flow gas-turbine jet propulsion engine getting its rotation test.

Science News Letter, February 28, 1948

THE FIELDS

CHEMISTRY

New Element, Technetium, Isolated as Pure Metal

► THE WORLD'S first samples of metallic technetium, chemical element number 43, have been isolated by Dr. Sherman Fried of the chemistry division of the Argonne National Laboratory, Chicago.

One of the last four of the 96 elements to be named, technetium is now revealed to be a silvery substance similar to the other rare metals, rhenium, osmium and ruthenium, which are located near it in the scheme of the periodic table of elements.

Two tiny quantities of the metal have been carefully prepared from compounds manufactured in the atomic "furnaces" at Oak Ridge and made available for this purpose by Dr. G. W. Parker of the Clinton Laboratories. Dr. Fried reports the isolation of the new metal in a communication to the *Journal of the Chemical Society*, (Jan.).

Science News Letter, February 28, 1948

ENGINEERING

Building Better Fire Is Goal of New Research

► BUILDING a better fire—one which will burn faster, give off more heat and waste less fuel than any fire in the world—is the goal of a group of scientists at the Westinghouse Research Laboratories, Pittsburgh.

If they succeed, the better fire will mean faster, cheaper travel in the future. Better fires could be utilized by jet engines in aircraft and gas turbine locomotives and ships of the future.

The combustion research is headed by Dr. Stewart Way. His group is making a four-way attack on the problem of more efficient fires. Here are some of the problems in building a better fire:

1. How fire burns under various conditions of temperature, pressure and fuel mixture.
2. Should air be injected into a fire at angle, with a swirling motion or in a circular fashion?
3. Constructing better chambers in which to build more effective fires.
4. Development of fuel nozzles to most efficiently spray fuel into the fire.

Even measuring how fast a fire burns is a tough job. Westinghouse scientists are doing it with mirrors. Test fuel is burned in a Bunsen burner, and rays of light from a 1,000-watt mercury vapor lamp, reflected with mirrors, are used to produce an image which can be photographed and studied.

Flames have been found to travel rather slowly at about two to five feet a second in a non-moving gas. But a stream of air will speed up the flames.

Air can also make the fuel burn faster by ripping up the fuel. This is done with an oil "atomizer," which generates a miniature cyclone of air. Up to 96% of the fuel can be converted into useful heat energy with a nozzle developed by these scientists.

Instead of a standard boiler, Westinghouse scientists have made a slender, nickel-chrome steel "sleeve" for a combustion chamber. This new jet furnace has a heat release 15 times greater than that from a steam boiler for its size.

Science News Letter, February 28, 1948

ENGINEERING

New Process Uses Steam To Extract Oil from Shale

► WITH the nation shivering in the first real pinch of an oil shortage, efforts are being redoubled to find a high-efficiency, low-cost method for getting oil out of the billions of tons of our still-unused oil shales. A different approach is embodied in U. S. patent 2,434,815, which has just been granted to Richard J. Shaw of Redondo Beach, Calif.

Instead of trying to extract the oil by roasting or other external heating process, Mr. Shaw treats the crushed shale with low-pressure superheated steam as it slowly slides over a perforated plate underlain with crushed rock. The rock traps powdered shale particles in the oil that flows out, leaving the filtered oil to flow on downward into a collector. Volatile hydrocarbons mixed with the steam are condensed out and added to the oil stock, while the water from the condensation is led off for the extraction of ammonia and other valuable byproducts.

The residue of the shale, still containing unextractable but combustible solids, is discharged into a firebox, where an air blast forces it to yield the last of its fuel value for the production of more superheated steam.

The inventor has assigned his patent rights to the Union Oil Company of California.

Science News Letter, February 28, 1948

PSYCHIATRY

First Psychiatric Aide Award Given to Attendant

► A MILESTONE on the road to better care for patients in mental hospitals has been passed with the selection of the recipient for the first Psychiatric Aide of the Year Award. He is Walter Starnes of Winter Veterans Administration Hospital at Topeka, Kans.

The psychiatric aide, better known as the mental hospital attendant, is the man or woman who can be the daily and nightly friend, prop and helper of the mentally sick patient. Or the aide can be the daily and nightly terror of the helpless patients in mental hospitals.

To encourage better standards of care in mental hospitals by recognizing the value of a good attendant's services, the National Mental Health Foundation of Philadelphia has established its Psychiatric Aide of the Year awards. In their field they are the equivalent of a Nobel Prize or Hollywood's Oscars.

The award consists of \$500 and a citation. Five candidates for honorable mention have also been cited and will each receive \$50. They are: Miss Elizabeth Johnson, Ypsilanti State Hospital, Ypsilanti, Mich.; Dee Fletcher, VA Hospital, North Little Rock, Ark.; Mrs. Viola M. Griffith, St. Elizabeth's Hospital, Washington, D. C.; William Finn, VA Hospital, Northampton, Mass.; and Roy Kimberling, Middletown State Hospital, Middletown, N. Y.

Science News Letter, February 28, 1948

PHYSICS

Radioactive Soil Buried After Agriculture Tests

► RADIOACTIVE elements used in fertilizer tests on plants by U. S. Department of Agriculture scientists have necessitated a revolution in handling used soil and its greenhouse containers afterwards. Too "tricky" to be kept for reuse, both soil and containers are deeply buried.

The "trickiness" does not consist so much in danger to the experimenters (though that might enter the problem, in some cases) as in the fact that some of the stuff remains radioactive for a long time afterwards, and would falsify readings on Geiger counters if it were left lying about.

Because of this once-only use, cheap tin cans coated with enamel have replaced the familiar clay flowerpots and jars.

Science News Letter, February 28, 1948

ASTRONOMY

Spring Begins on March 20

Winter constellations are being replaced by those of spring as Bootes, the bear driver, becomes visible low in the northeast and Virgo in the southeast.

By JAMES STOKLEY

➤ ON the morning of Saturday, March 20, the sun reaches the halfway point in the northward journey it started just before Christmas. To a person on the equator, it then passes directly overhead at noon. This is known as the vernal equinox, and it marks the beginning of spring to those in the northern hemisphere. In southern countries, on the other hand, summer is then over, and it is the beginning of autumn.

This event, so welcome to people who have not been fortunate enough to escape from regions where snow had to be shoveled, ear muffs worn and chains put on automobiles, is also reflected in the evening skies. These are depicted on the accompanying maps as they appear at 10:00 p.m. (your own kind of standard time) on March 1, an hour earlier in the middle of the month and two hours earlier at the end.

Winter Stars Declining

Constellations that stood high in the south on early winter evenings are still with us, but declining in the west, getting ready to vanish in a couple of months. Orion is in the southwest, now in an upright position, for the star Betelgeuse, and the fainter and unnamed one just to the left of it (which is called Bellatrix) mark the shoulders of this great warrior. The three stars in a row, as marked, form his belt, while Rigel, below, is in one of his legs. To the right is Taurus, the bull, with first magnitude and ruddy Aldebaran to mark his eye. Still farther right, shown on the northern map, we find Auriga, the charioteer, with brilliant Capella.

To the left of Orion, and lower in the sky, one can see Canis Major, the great dog, with Sirius, which is the most brilliant, because it is also one of the nearest, stars visible in the night time sky. Above this is the inconspicuous constellation of Monoceros, the unicorn, and over that the lesser dog, Canis Minor, can be found. This contains another star of the first magnitude, called Procyon. Ascending still higher, we come to the twins, Gemini, with the

stars Castor and Pollux. The latter is of the first magnitude in the astronomical scale, and the former of the second. A star of one magnitude is about 2.5 times as bright as the next fainter. In order to get Sirius into this scheme, we have to go to magnitudes less than zero, so we say that it is of magnitude minus 1.6. This means, for example, that it is 6.9 times as bright as Procyon, whose magnitude is 0.5.

Spring Constellations

To take the place of the winter constellations which are getting ready to disappear, those of spring are coming into view in the east. Low in the northeast, Bootes, the bear-driver, is visible, and in this, bright Arcturus shines. The bear he is driving is Ursa Major, the great bear, of which the big dipper is part. This is just above one end of Bootes. In fact, it is a good idea to locate it first. Then by following the curve of the dipper's handle, one easily locates Arcturus.

In the southeast is Virgo, the virgin, another group typical of spring, and in which we see Spica near the horizon. Above Virgo there is a second magnitude star, Denebola, which marks the tail of Leo, the lion. The so-called "sickle," with Regulus at the end of the handle, indicates the lion's head. It is in this same part of the sky that we see two of March's three evening planets.

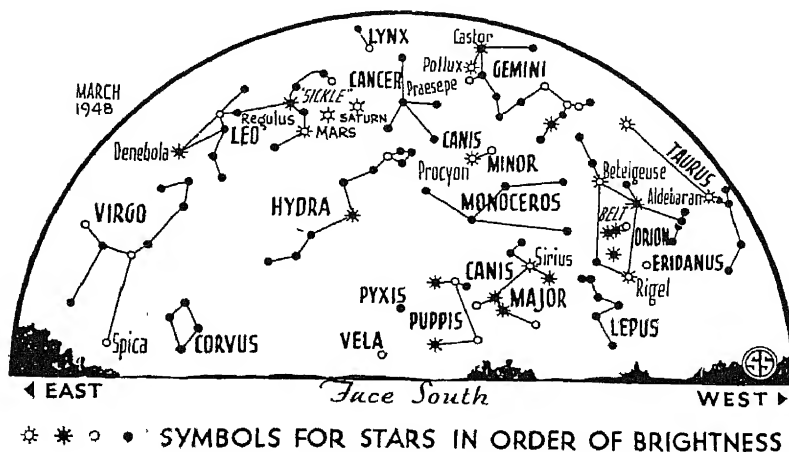
Mars, red in color, is brightest. Now drawing away from us, it is rapidly getting fainter. Fainter yet, but still brighter than Regulus, is Saturn, farther west, and just across the border into the next door constellation of Cancer, the Crab. The moon passes these planets on March 21.

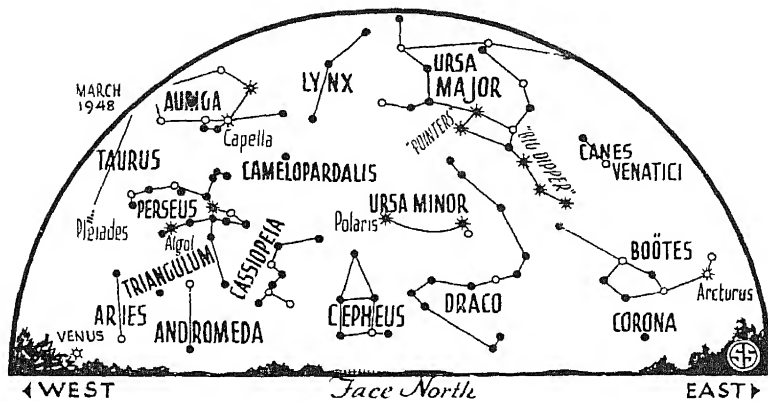
Venus Is Brightest

Though it is low in the west by the times for these maps, Venus is really the brightest planet visible these evenings. It can be seen in the west long before any other star or planet comes into view, so there is little doubt about its identity. The second brightest planet is Jupiter, which is in Sagittarius, the archer, and rises a little after midnight. Mercury is a morning star this month, and can be seen low in the east just before sunrise about March 17. This is the date when it is farthest west of the sun.

When the moon reaches the full phase on March 25, it has a special significance not shared by full moons in other months. For this is the paschal full moon—the first after the vernal equinox, and the one which determines the date of Easter, which comes on the following Sunday, March 28. This rule for determining the date of Easter was established by the Council of Nicaea in 325 A. D.

Since the moon is full only five days after the equinox, Easter comes in 1948 earlier than average (which is about April 9) but not as early as it may come. For calendar purposes the equinox is taken as March 21, though as this year





it may come on the 20th. If the 21st is a Saturday, and also the day of full moon, Easter will come on March 22, as it did last in 1818. Not during this, or the next two, centuries, will it again come as early. In 1913 it came on March 23, and it will again in 2008, unless, as is likely, the calendar is reformed again before then.

The latest possible date for Easter is April 25. This happens when the moon is full on March 20, just missing the calendar equinox, and when the succeeding full moon, on April 18, falls on a Sunday. The following Sunday, April 25, is Easter, which occurred last in 1943.

Since the first day of the Jewish Passover also depends on the phases of the moon, and the vernal equinox, the Council of Nicaea decided that when the paschal full moon itself falls on a Sunday, Easter should be the Sunday next following. This prevents the beginning of Passover and Easter from ever coinciding, though they do generally come about the same time. That, however, does not happen this year, for Passover begins on Saturday, April 24. An excellent explanation of this difference has been given to the writer by Dr. G. M. Clemence, director of the Nautical Almanac, the astronomer's "bible," which is published every year by the U. S. Naval Observatory in Washington. His statement follows:

"The Passover is on a fixed date in the Jewish calendar. In accordance with the ancient Mosaic laws, the Passover begins on the evening of the 14th day of the month Nisan, which in 1948 is the evening of Friday, April 23, so that the first day of the Passover is Saturday, April 24 (Nisan 15), and is in the year 5708 of the Jewish era. The year 5708 is a leap year, in which an intercalary month is inserted preceding Nisan. This has the effect of delaying the Passover about a month. If it happens

that Easter is early, the two may be separated by a considerable interval, as occurs in 1948.

"The ancient Jewish calendar was a lunar calendar, the beginning of each month being determined by actual observation of the first appearance of the lunar crescent after sunset; and Nisan began with the new moon nearest the vernal equinox. No fixed system of intercalation (insertion of extra months) was in use. This empirical calendar was superseded many centuries ago by a calendar based on fixed arbitrary rules, and consequently the Passover no longer bears much relation to the actual moon.

"Easter originated as a counterpart and continuation of the Jewish Passover; but, likewise, in the course of time, has come to be determined by arbitrary rules which are not based on the actual moon, but on an ecclesiastical moon which is defined by conventional tables drawn up by the church. The two religious days are, therefore, essentially independent of each other and of the actual moon, although in the long run all three are in general average agreement."

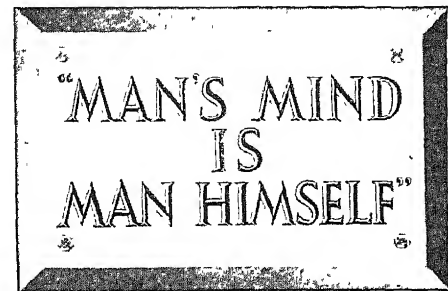
Thank you, Dr. Clemence.

Time Table for March

2	11:35 a. m.	Moon in last quarter
3	3:37 p. m.	Moon passes Jupiter
7	9:00 a. m.	Moon farthest, distance 252,400 miles
8	4:47 a. m.	Moon passes Mercury
10	4:15 p. m.	New moon
13	3:36 a. m.	Algol (variable star in Perseus) at minimum brightness
14	9:57 a. m.	Moon passes Venus
16	12:25 a. m.	Algol at minimum
17	3:00 p. m.	Mercury farthest west of sun
18	7:27 a. m.	Moon in first quarter
19	9:14 p. m.	Algol at minimum
20	11:57 a. m.	Vernal equinox; sun over equator and spring commences
21	2:43 p. m.	Moon passes Saturn
	6:04 p. m.	Algol at minimum
	7:16 p. m.	Moon passes Mars
23	3:00 a. m.	Moon nearest, distance 224,600 miles
24	10:10 p. m.	Full moon (paschal)
31	3:54 a. m.	Moon passes Jupiter

Subtract one hour for CST, two hours for MST, and three for PST.

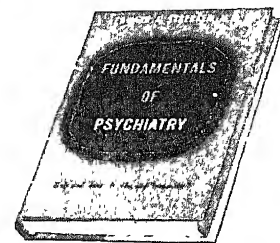
Science News Letter, February 28, 1948



LIPPINCOTT

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Do You Know?

The cost of *highway* improvement is nearly double that of 1940.

A coin-in-the-slot, self-service *gasoline station* is in use in Australia.

The consumption of *natural rubber* exceeded that of the synthetic product during 1947 for the first time since 1943.

On the second day of this year the *earth* was at its closest point to the sun; it was some 4,000,000 miles nearer than the 94,451,000 miles that separated the two on July 5, 1947.

Airplanes on the North Atlantic trans-oceanic route are voluntarily acting as *relay stations* to forward to others radio messages received on very high frequency when normal frequency is interrupted by magnetic storms.

AGRICULTURE

Potential Fuel Wasted in Processing Farm Products

➤ NINE billion gallons of potential fuel are wasted each year in processing agricultural products, three U. S. Department of Agriculture scientists state.

The untapped sources of synthetic fuel include corn cobs, peanut shells and countless other agricultural wastes. Writing in the *Journal of the American Society of Agricultural Engineers* (Jan.), J. W. Dunning, P. Winter and D. Dallas of the Department of Agriculture's synthetic liquid fuels project explain that the farm wastes could be hydrolyzed into sugars which could be converted to fuels.

These synthetic fuels could not compete with natural fuels, but they would help meet demands in situations such as the present shortages.

A Department of Agriculture semi-works plant at Peoria, Ill., has begun experiments which indicate that a single ton of the farm waste can produce 90 gallons of fuel. Estimating the total of such material wasted each year at 200,000,000 tons, the scientists put the annual fuel potential at 9,000,000,000 gallons.

In addition to serving as reserve for petroleum fuels, the fuels from farm wastes also may find special applications in industry, the scientists suggest.

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ENGINEERING

New Home-Heating Device

Made of electrically conductive rubber, these panels are set in the ceiling and require no wires in their heating area. Also claimed to be economical.

➤ ELECTRIC heating panels set in the ceiling are the latest in home-heating devices. Their heating element is a special electrically conductive rubber; there are no wires in their heating area.

These radiant heating panels are a development of the United States Rubber Company of Passaic, N. J., and were made under the direction of C. W. Higbee. They provide an efficient system for home heating, he says, and an economical one if electricity does not cost over one and one-half cents per kilowatt hour. They have already been tested in a dozen homes throughout the country.

The panels, when properly installed, can not be distinguished from the rest of the ceiling. They look like ordinary wallboard, and are a quarter of an inch thick. Some 70% of the ceiling is covered with them in an average installation, the rest of the ceiling being covered

with standard material. The whole is then painted, papered, plastered or covered with a fabric so that the ceiling is uniform in finish.

The panels, which are four by four feet in size, consist of a layer of the rubber, which has been made conductive by a chemical process, between several layers of a phenolic plastic which is an insulator. The whole is made rigid with a backing of asbestos board, and aluminum foil is placed on the upper side to keep the heat from going upward.

Wires bring electric current to the edges of the conductive rubber, whose resistance is enough to create heat. The panels operate on 220-volt current, and are made for wattage densities of either 17 or 22 watts per square foot. The trade name for the new radiant heating panel is Uskon.

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PALEONTOLOGY

Reptile Bones Fill Gap

➤ SPECIMENS of therapsida, a "missing link" between reptiles and mammals, have been unearthed by the University of California Expedition in South Africa. The finds were made by Dr. Charles Camp and Dr. Frank Peabody in the Karoo desert, near Bethlehem, Cape Province.

Therapsida, dog-like in form, was the most mammal-like of reptiles and came from the same stock as the dinosaurs. It appeared in the Upper Permian, just short of two hundred million years ago. During the hundred-million-year reign of the dinosaurs it quietly evolved into true mammals, which took over on the demise of the dinosaurs. The Upper Permian rocks of North America and other parts of the world except South Africa and northern Russia are barren of Upper Permian fossils. Thus the African species may help fill a gap in the ancestry of modern living forms.

Dr. Camp said the reptiles were particularly mammalian in the structure of the lower jaw. A typical reptile has a number of bones in its lower jaw, which are

reduced to single jawbone in mammals. Dr. Camp reports excellent specimens of ictidosauria, most mammalian type of therapsida, which had an almost mammalian lower jaw. He also collected fossils of tiny reptiles and amphibians. There is one reptile skull about the size of an almond, with skeleton proportionately tiny.

Science News Letter, February 28, 1948

Science Service Radio

➤ LISTEN in to a discussion on earthquakes on "Adventures in Science" over Columbia Broadcasting System at 3:15 p.m. EST Saturday, March 6, Ralph Bodle, geophysicist at the U. S. Coast and Geodetic Survey, of the Department of Commerce, will be the guest of Watson Davis, Director of Science Service. Mr. Bodle will tell you interesting facts about earthquakes—what causes them, how they are recorded, where they occur, and other highlights.

Science News Letter, February 28, 1948

ORNITHOLOGY

**Cemetery Is Site of
Bird Population Study**

➤ A SEARCH for the living among the dead was abundantly rewarded in the study of the bird population of a Madison cemetery, made by George E. Koehler, 17, a senior at West High School, Madison, Wis. His records, methodically kept over a four-year period, show that the 80-acre wooded tract has no less than 106 species of bird inhabitants—with 11 more species seen winging overhead for good measure.

Greatest number of individual birds seen on any one day was 688, on a warm June day. Low point was reached after a two-day blizzard, when the only birds he could find were two bluejays.

Mr. Koehler makes a complete count of birds found in the cemetery once a month, with weekly visits during migration seasons. Along with a record of bird species present and numbers of individuals counted, he takes note also of all weather conditions, then correlates his bird counts with the environmental factors.

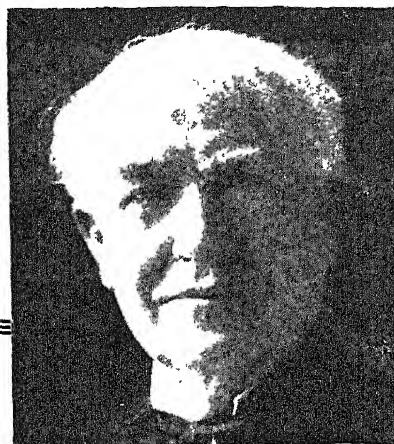
"The most significant result of these census projects," he states, "has been the amazing correlation between various weather conditions and the census figures: the effect a heavy snow will have upon the number of ground feeders present; the way a strong wind will drive the small species to the lower, more sheltered parts; the effect of the sun and the time of day on the amount of singing; and the amazing relationship between two graph lines, one representing temperature on each field trip and the other the number of individuals observed."

Together with his mother, who shares his interest in birds, Mr. Koehler has also made a detailed study of all nests found in the cemetery. In the course of his four years of observation he has found 466 nests representing 21 species. Bad weather during 1946 caused a sharp fall in the nesting population, he notes, but 1947, with weather more nearly normal, saw a comeback.

"I know that my scientific project has not added anything of great value to the science of ornithology," he concludes, modestly, "but it has added a great deal to my knowledge."

Mr. Koehler reports his bird studies in an essay submitted in connection with his participation in the Seventh Annual Science Talent Search.

Science News Letter, February 28, 1948



Thomas A.
EDISON

ADVANCE ANNOUNCEMENT

THE Philosophical Library, *Publishers*, deems it a privilege to announce the forthcoming publication of *The Diary and Sundry Observations of Thomas Edison*, edited by Dagobert D. Runes, and presented for the first time in book form.

Thomas A. Edison was not a desk scientist. His mind was forever searching for new paths, new ways into the mysteries that surround us, and many a precious secret was he able to wrest from Nature. This study of Edison's observations and notes is like a fascinating trip into the unknown. Here was a great scientist and a great American.

From the Table Of Contents: *On Atomic Energy, The Wars Of Tomorrow, Harnessing Of New Powers, The Habit Of Forgetting, The Inventor's Lot, Economics Of Fear, The Mystery Of Life.*

The *Diary And Sundry Observations Of Thomas Edison* will be published on April 19. Due to present conditions, the edition will be necessarily limited. Your bookseller will take your order now for a copy to be delivered on publication. You may order, if you wish, directly from the publishers by sending your remittance of \$4.75 to the

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Have We Learned?

➤ **EXPERIENCE** is proverbially the best teacher; although, it has been wryly added, a dear one. The discouraging thing is that so many of us, having taken a course in her costly though by no means exclusive school, insist on re-matriculating and immediately putting on the dunce-cap.

A new edition of Prof. Paul Sears' conservation classic, *Deserts on the March*, has just appeared. It tells again the too-familiar story of reckless and ruinous cropping methods, of soil exhaustion and erosion, of draught and dust-storms. Many of the chapters are unchanged; but they had no need for change, any more than chapters in Jeremiah or Ezekiel. The price of disobedience to the Law that sustains the world remains the same: famine, and pestilence, and desolation in the high places.

But Prof. Sears adds a new final chapter of tempered optimism, in which he dwells upon advances made in the practice of erosion control, and especially on the hard-learned willingness of farm communities to plan and plow together instead of on the destructive and often outright suicidal *laissez-faire* pattern

traditional in American agriculture. It looks quite encouraging.

However, there have again been disquieting reports from the Plains, where fleetingly favorable weather and high grain prices put an occasional premium on boom wheat farming. Big speculative operators are said to be ripping up grass-held land by tens of thousands of acres, planning to rake in the money as fast as they can while good seasons last and then to clear out, leaving the permanent farmers to reap the dust-laden whirlwind.

They almost got caught last year. At the end of his penultimate chapter, Prof. Sears writes: "Dust storms obscuring the sun for days at a time were raging when

the author began writing *Deserts on the March*; today . . . rain is falling and has been falling in the greatest quantity since the weather records began, swelling rivers into murky torrents laden with rich farm soil." That passage could not have been written later than June of 1947; for a few weeks after those ruinous rains ceased an equally ruinous drought set in. Wheat got by, but corn was caught disastrously short. And during the past fall and winter the return of the dust storms was averted by only the thinnest margin of timely snow.

Have we as a people yet learned? The coming summer may give us our answer.

Science News Letter, February 28, 1948

PUBLIC HEALTH

Recruiting for Health

Wartime volunteer workers may be asked to put National Health Assembly recommendations into effect in home-town war on disease.

➤ **THE** millions of women from every hamlet and city of the nation who volunteered their services to the Red Cross and similar organizations during World War II are going to be asked to serve in another war.

This time the women and the men who worked beside them will be fighting disease and needless death and crippling in their home towns. If a hospital or a diagnostic clinic is needed in the community, if the county is without a full-time health officer, if the school needs a health program, these are the women and men to get it.

Because he is convinced of the power and ability of the wartime volunteer workers, Oscar V. Ewing, Federal Security Administrator, hopes to arouse their enthusiasm to carry out recommendations of the National Health Assembly to be held in Washington May 1-4.

What the Assembly will recommend is not precisely known. It is being called as a result of a message of President Truman requesting Mr. Ewing to develop "feasible national health goals for the next 10 years."

The controversial problem of national health insurance may be discussed. But Mr. Ewing and medical leaders agree that pending settlement of that controversy there are many other non-controversial health problems that need to be attacked at once.

More doctors and dentists, medical and dental research scientists, nurses and technicians are perhaps the biggest health need of the nation at present. Greatest obstacle to improving health, either by discovery of new remedies for disease or by applying those already known, is the bottleneck in personnel.

A bill for Federal subsidy for medical education is now being prepared, Mr. Ewing said, in the hope of overcoming this bottleneck to improved national health.

Many health needs, however, are local and can best be met when the people of the locality are aroused to the need.

One problem which Mr. Ewing hopes can be solved by the National Health Assembly is the matter of the many overlapping voluntary health agencies. Often, he pointed out, such an agency has been so good that it achieved its aim. But instead of then dissolving when its mission is accomplished, it "keeps going like the bureaucrats," he said. The problem is to fit these agencies into the local health situation as it changes. Men and women in the community, he believes, can help with this.

Organizing health activities of an area on an area or regional basis, regardless of governmental organization such as townships, counties or towns, is one big thing which must, in Mr. Ewing's opinion, be done.

Science News Letter, February 28, 1948

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AN ANCIENT SITE AT BORAX LAKE, CALIFORNIA—Mark Raymond Harrington—*Southwest Museum*, 131 p., illus., paper, \$3.00. The study of a campsite some 10,000 years old.

BACKGROUND MATERIAL ON ACTIVITY IN FIRST YEAR OF DISTRIBUTION OF PILE PRODUCED RADIO-ISOTOPES — U. S. Atomic Energy Commission — *Gov't Printing Office*, 24 p., paper, 10 cents.

BRIEF PSYCHOTHERAPY—Bertrand S. Frohman with collaboration of Evelyn P. Frohman—*Lea and Febiger*, 265 p., \$4.00. To aid physicians in detecting the psychological factors that may underlie physical disorders.

THE CHALLENGE OF PARENTHOOD—Rudolf Dreikurs—*Duell, Sloan & Pearce*, 334 p., \$3.50. A book for "problem parents" intended to aid in preventing dictatorship in the home and the occurrence of those damaging childhood experiences that are at the roots of adult personality difficulties.

CHEMISTRY IN ACTION—George M. Rawlins and Alden H. Struble—*Heath*, 568 p., illus., \$3.00. An attractive text for high school.

DISABILITY EVALUATION Principles of Treatment of Compensable Injuries—Earl D. McBride—*Lippincott*, 4th ed., 667 p., illus., \$12.00. For physicians concerned with reporting on disabilities and estimating extent of recovery. A chapter on "Employment of the Physically Disabled" is added to this edition.

ELEMENTS OF RADIO—Abraham Marcus and William Marcus—*Prentice-Hall*, 2d ed., 751 p., illus., \$4.00. Intended for use as a handbook or home study course for beginners.

FUNDAMENTAL ELECTRONICS AND VACUUM TUBES — Arthur Lemuel Albert — *Macmillan*, rev. ed., 510 p., illus., \$6.00. A college text.

THE GROWTH OF PHYSICAL SCIENCE—James Jeans—*Macmillan*, 364 p., illus., \$4.00. A book for the layman who has interests in this important field, and also for students of physics. The author corrected the proofs shortly before his death.

HANDBOOK OF CHEMISTRY AND PHYSICS: A Ready-Reference Book of Chemical and Physical Data—Charles D. Hodgman, Ed.—*Chemical Rubber Publishing Co.*, 30th ed., 2686 p., \$6.00. A revised and enlarged edition of a familiar reference book.

HYPNOTISM COMES OF AGE: Its Progress From Mesmer to Psychoanalysis—Bernard Wolfe and Raymond Rosenthal—*Bobbs-Merrill*, 272 p., \$3.00. An editor of *Mechanix Illustrated* and a former soldier with experience as a patient in Army hospitals write popularly of this technique in medicine.

IN HENRY'S BACKYARD: The Races of Mankind—Ruth Benedict and Gene Weltfish—*Schuman*, illus., \$2.00. A little book of amusing pictures setting forth a serious story exploding many of the fallacies concerning the differences between races. It is based on the much-discussed pamphlet "Races of Mankind."

THE INTEGRATIVE ACTION OF THE NERVOUS SYSTEM—Charles Sherrington—*Yale University Press*, 433 p., illus., \$6.00. A new and revised edition of a well-known book first published in 1906.

KNOW YOUR HEART—Howard Blakeslee—*Public Affairs Committee*, 31 p., illus., paper, 20 cents. Prepared by a science writer with the cooperation of the American Heart Association.

LAYOUT—Charles J. Felten—*Felten*, 132 p., illus., \$5.00. A beautiful book illustrated with photographs and drawings for artists, advertisers, and printers.

LECTURE SERIES IN NUCLEAR PHYSICS—E. M. McMillan and others—*Govt. Printing Office*, 132 p., paper, 55 cents. Originally prepared for use of the Los Alamos scientists and later declassified.

MARINER OF THE NORTH: The Life of Captain Bob Bartlett—George Palmer Putnam—*Duell, Sloan and Pearce*, 246 p., \$3.50. The biography of an explorer written by a man who is himself an explorer.

MATHEMATICAL TABLES—Charles D. Hodgman—*Chemical Rubber Publishing Co.*, 8th ed., 366 p., Desk size \$1.75, Pocket size \$1.25. A convenient collection of reference material from the Handbook of Chemistry and Physics.

PAPERS OF THE MICHIGAN ACADEMY OF SCIENCE, ARTS AND LETTERS—Eugene S. McCartney and Henry Van Der Schalie, Eds.—*University of Michigan Press*, 325 p., illus., \$3.75.

PHARMACEUTICAL PREPARATIONS—George E. Crossen and Karl J. Goldner—*Lea and Febiger*, 2d ed., 250 p., \$4.00. Text for pharmacy students.

THE PRACTICAL HANDBOOK OF BETTER ENGLISH—Frank Colby—*Grosset & Dunlap*, 2d ed., 309 p., \$1.00. Interesting and helpful.

PRACTICAL MARINE ENGINEERING—Reno C. King, Jr.—*Prentice-Hall*, 470 p., illus., \$6.00. For the man who is going to operate a marine steam power plant.

PREHISTORIC CERAMIC STYLES OF LOWLAND SOUTH AMERICA, THEIR DISTRIBUTION AND HISTORY—George D. Howard—*Yale University Press*, 95 p., 15 pl., paper, \$1.50.

PREPARING FOR FEDERAL RADIO OPERATOR EXAMINATIONS—Arnold Shostak—*Prentice-Hall*, 404 p., \$3.75. In question and answer form.

PSYCHOLOGICAL ATLAS — David Katz — *Philosophical Library*, 142 p., illus., \$5.00. A collection of graphic material by a professor of the University of Stockholm intended for the young student but interesting to many others as well.

SIGMUND FREUD, AN INTRODUCTION: A Presentation of His Theory, and a Discussion of the Relationship Between Psychoanalysis and Sociology—Walter Hollitscher—*Oxford University Press*, 119 p., \$2.50.

TELEPATHY AND MEDICAL PSYCHOLOGY—Jan Ehrenwald—*Norton*, 212 p., \$3.00. A psychiatrist, formerly of Prague and Vienna, writes on a controversial subject. Many psychologists will probably disagree

with the views expressed.

TOWARD GENERAL EDUCATION—Earl F. McGrath and others—*Macmillan*, 224 p., \$3.00. The result of discussions, informal at first, on how education could be made to prepare young people to meet contemporary problems more effectively. The authors are members of the faculty of the University of Iowa.

TREATMENT BY DIET — Clifford J. Borka—*Lippincott*, 5th ed., 784 p., illus., \$10.00. A technical book for physicians and dietitians.

Science News Letter, February 28, 1948

ENGINEERING

X-Rays Measure Thickness Of Red-Hot Metal Strips

➤ THE same X-ray that makes pictures of the interior of the human body is now measuring the thickness of red-hot metal strips emerging from the rollers in giant steel mills, too hot to be measured otherwise.

The process, with equipment revealed by General Electric, is automatic and continuous, although the metal may be moving at speeds up to 2,000 feet per minute, and there is no physical contact with the red-hot steel. A beam of X-ray which passes constantly through the steel does the trick.

At the same time another beam passes through a standard reference sample of the desired thickness. The densities of both emerging rays are picked up in a radiation detector. If the densities of the two are the same, the steels are of equal thickness. If the densities are different, the hot steel is indicated as too thick or too thin.

In conventional methods, thickness is measured by hand-held calipers which can not be used until the metal is cool. If the thickness is found incorrect, re-rolling is necessary. With the new X-ray method, adjustments can be made immediately if proper thickness is not being obtained.

Science News Letter, February 28, 1948

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☼ **ASH-TRAYS** of plated silver have clips by which they can be easily attached to the edge of a saucer on the dining table. Provided in sets, one for each smoker, they discourage putting cigaret ashes into tea cups.

Science News Letter, February 28, 1948

☼ **WHEEL ALIGNMENT** device for automobiles, recently patented, is a horizontal cross-bar which can be placed at any position from one front wheel to its mate in contact with the treads, with movable brackets which are adjusted to contact the side walls of the tires.

Science News Letter, February 28, 1948

☼ **FLAT-STEM THERMOMETER**, which can be clamped or screwed down in any desirable position to a machine part the temperature of which is wanted, enables the heat element to go snugly against the object under test, presenting a wide heat-absorbing area. It is a dial-type instrument.

Science News Letter, February 28, 1948

☼ **WINDOW WASHER** for passenger trains scoots down the side of the train while it is stopped at a station and cleans all windows in a few minutes. It is an upright revolving brush, mounted window-height on a powered platform tractor truck and water tank; the glass is sprayed as scrubbed.

Science News Letter, February 28, 1948

☼ **WATER-WARMER**, to keep drinking troughs for livestock from freezing over in cold weather, is a floating elec-



tric heater that never gets hot enough to burn or frighten the animal. No ice forms near it, as shown in the picture, and the heat is cut off by thermostatic control when not needed.

Science News Letter, February 28, 1948

☼ **SLIP-SPOOL** reel for fishing eliminates backlash in bait casting. The spool winding is at right angle to the shaft of the rod, and the line slips off the front of the reel, released by a trigger, with the forward motion of the cast. The spool is manually turned to rewind the line.

Science News Letter, February 28, 1948

☼ **LOCK AND LATCH** sets for the new home are available in unit pack-

ages, complete for all needs. The individual pieces are selected to harmonize with the architecture of the average small home, and contain among other fixtures a front door and a rear door lock both opening with the same key.

Science News Letter, February 28, 1948

☼ **POWER RECORDER** for aircraft and other engines makes a record of the total power-hour units turned out by an engine by continuously measuring the engine speed, manifold pressure and atmospheric pressure. One use is on fly-yourself planes so that customers can be charged for engine-service time.

Science News Letter, February 28, 1948

You are invited to accept one of the few memberships still vacant in

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Question Box

AERONAUTICS

How was the first flight of a guided missile achieved? p. 132.

BACTERIOLOGY

How could air-borne disease germs be checked? p. 131.

ENGINEERING

What has been proposed as a solution to congested traffic? p. 130.

What is the new home-heating device? p. 140.

MEDICINE

How does mental conflict express itself in the body? p. 135.

NUCLEAR PHYSICS

What is at the heart of Yale's new atom-smasher? p. 131.

PALEONTOLOGY

What "missing link" bones have been unearthed in South Africa? p. 140.

PUBLIC HEALTH

What other way may wartime volunteer workers be asked to fight? p. 142.

Photographs: Cover, Westinghouse Electric Corp.; p. 130, Gibbs and Hill, Inc.; p. 131, Yale University; p. 133, Bell Telephone Laboratories; p. 135, Museum of Science and Industry, Chicago.

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Vol. 53, No. 10

THE WEEKLY SUMMARY OF CURRENT SCIENCE • MARCH 6, 1948



White House Welcome

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ASTRONOMY

Lichens Possible on Mars

Observations were made by infrared heat-light reflections from the planet which showed that there were no trees, flowers or ferns.

➤ **IMAGINE** a mountain peak twice as high as Mt. Everest, sticking up 10 miles in the stratosphere. That would be the earth's closest approach to a Martian landscape, as judged by the latest observations upon the planet Mars made at McDonald Observatory, Fort Davis, Tex.

No trees. No flowers. Not even ferns. The only possible life would be mosses and lichens such as cling to lofty, frigid peaks here on earth. There is no chance of the higher life forms such as the most primitive animals, much less anything like a man or a Wellsian monster.

Observations of infrared heat-light reflections from the planet, seen through the McDonald 82-inch telescope, are consistent with the existence there of mosses and lichens in the green areas of the planet.

With Mars 63,000,000 miles away and closer than at any other time in 1947, 1948 and 1949, Dr. Gerard P. Kuiper, director of the McDonald Observatory, used new heat-light measuring instruments to scan the magnified disk.

The polar cap is not "dry ice" or carbon dioxide snow as some astronomers suggested, but is probably ordinary ice or snow. This was indicated by the reflection of light in the spectrum beyond 1.5 microns, where the color was black as are water, snow and ice and not white as carbon dioxide snow would be.

Carbon dioxide does exist in the Martian atmosphere, as discovered at McDonald Observatory last October. Mt. Wilson Observatory observations have shown that no appreciable amount of oxygen exists on Mars, but its lack would not rule out the growth of mosses and lichens on the planet.

Another Martian mystery must be solved before even the lowest forms of life are indisputedly possible. Nothing in the Martian atmosphere has yet been found to filter out the ultraviolet rays of the sun that would be fatal to all life. Nevertheless something does cause the Mars "air" to be opaque so far as the ultraviolet light can be measured. Dr. Kuiper and his colleagues have found that it is not sulfur dioxide, which is a heavy gas produced by volcanoes and

meteoric impact. Small amounts of it could absorb the fatal ultraviolet. Very sensitive spectroscopic tests showed no trace of sulfur dioxide on Mars or the moon.

Ozone in the upper air keeps life on the earth from being killed by a super-sunburn but this form of oxygen cannot be a shield to Mars as no oxygen exists there.

The ultraviolet light may be stopped on Mars by fine dust in its atmosphere swept up by winds that are known to attain at least 30 miles per hour in some cases.

It never rains on Mars. There are no lakes or oceans, not even any liquid water. The water in the form of vapor or frost would be sucked up by lichens from the air.

The temperature rises to only a little above freezing during the day at the Martian equator and drops to 80 to 100 degrees below zero Fahrenheit by night.

Conditions on Mars are comparable to those on earth at an elevation of 50,000 feet.

This new picture of Mars may be a forecast of things to come for the earth itself. Mars is a worn-out planet with conditions that probably will prevail on earth many millions of years hence when most of our atmosphere has been lost and mankind has long since disappeared.

Science News Letter, March 6, 1948

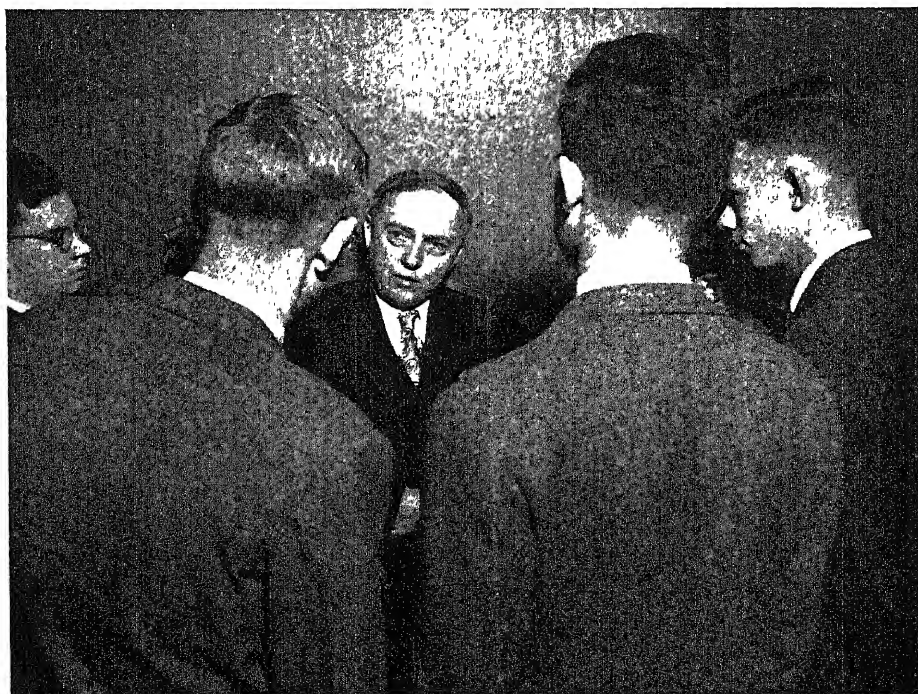
GENERAL SCIENCE

Winning Science Project Puts Boy in Hospital

➤ **SCIENTIFIC** experiments on straw for insulation material won 17-year old Jim Richardson a trip to Washington to compete for a college scholarship—and the same experiment almost prevented him from coming.

Jim was one of the 40 winners of the Seventh Annual Science Talent Search. He attended the five-day Science Talent Institute where \$11,000 in Westinghouse Science Scholarships were awarded.

But the stuff that broke the camel's back, almost brought both fame and bitter disappointment to the local teenage scientist. His description of his work in converting wheat and oat straw into insulation material helped place him among the winners of the Science Talent



QUIZZING THE JUDGE—Dr. Harlow Shapley, director of the Harvard College Observatory and president of Science Service, is answering the questions put by some of the Science Talent Search winners.
Linlithgow Library.

Search. Then, Jim found himself in a hospital with a fungus infection of the hands. Doctors diagnosed the trouble as due to handling the straw.

After treatments with penicillin and

aluminum acetate solution, his hands began to heal. Jim left the hospital just in time to pack for his trip to Washington.

Science News Letter, March 6, 1948

MEDICINE

Save Six Out of Seven

➤ SIX out of seven babies and children suffering from tuberculous meningitis have been saved by treatment with streptomycin and promizole.

Their cases are reported by Drs. Edith M. Lincoln, Thomas W. Kirmse and Estelle De Vito of Bellevue Hospital and New York University in the *Journal of the American Medical Association* (Feb. 28).

The six children who survived this usually deadly disease have not been under observation long enough for their doctors to call them "cured." But they are all living three to eight months after the start of the treatment and they are all normal mentally with no signs of nerve damage except mild ones in two.

"Streptomycin," the doctors state in their medical report, "has revolutionized our attitude toward tuberculous meningitis. Before this antibiotic was discovered the outlook was hopeless."

Some patients have apparently been cured by the mold remedy alone. But in some cases reported by other physicians, although the disease was apparently arrested by streptomycin, the patients later relapsed and died. And some patients who survived were left with

extensive damage to the nervous system.

The decision to combine streptomycin with promizole was based partly on results of the combined treatment when given to laboratory animals. Using the two together, Dr. M. I. Smith of the National Institute of Health had reported, heightens the action of the two remedies beyond the expected value of either alone.

Promizole, which is in a way a relative of the sulfa drugs, brought encouraging results in the treatment of another kind of tuberculosis, the New York doctors had found. Promizole can apparently be given safely and effectively over a period of years, and can be taken by mouth, but it is slow to take effect. Streptomycin, on the other hand, acts quickly on the TB germs but cannot be given by mouth and is more toxic than promizole. It has also the disadvantage that the germs may develop resistance to it. By giving the two drugs together the doctors thought they might get the benefit of the peculiar advantages each has.

The results seem to bear this out and the doctors hope others will be encouraged to try the combined treatment.

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dence is found in the fact that malachite green has no effect on solutions of virus in water, with no cells or enzymes present.

Hitherto no chemical treatment has been effective against virus diseases, with few exceptions. However, if further research with other chemicals indicates exactly which enzymes in the cell the virus borrows for its own nefarious purposes, a long step towards the conquest of the viruses will have been taken.

"Meanwhile," concludes Dr. Takahashi, "the possibility that malachite green may be of some value in the chemo-therapy of virus diseases must not be overlooked."

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BACTERIOLOGY

Expect to Conquer Viruses

➤ VIRUSES, the submicroscopic, almost-alive chemical compounds that cause many serious diseases in plants, animals and man, may some day be conquered with chemical weapons, as bacteria have been overcome by the sulfa drugs and such mold-derived compounds as penicillin and streptomycin. Experiments on the tobacco mosaic disease of plants, reported in *Science* (Feb. 27) by Dr. William N. Takahashi of the University of California, seem to point in this direction.

Dr. Takahashi used malachite green, a well-known synthetic dye, in very dilute solution on tobacco leaves inoculated with the mosaic virus. The num-

ber of diseased spots appearing on the treated leaves was a very small fraction of the number that appeared on untreated leaves used as controls.

In these experiments, the dye was used as a research tool rather than as a possible remedy. Dr. Takahashi knew that viruses can multiply only in living cells, and reasoned that they steal the use of certain enzymes, which are compounds used by the cell in its own life processes, to carry on the parasitic life of the viruses. He knew that malachite green blocks the action of some enzymes, and yet is not too poisonous to the whole plant. Results of his work are evidence in favor of his hypothesis. Further evi-

GENERAL SCIENCE

Science Talent Institute

Eminent scientists participated in event held in Washington for the 40 high school winners of the honor-trip. Radio study originates new branch of astronomy.

See Front Cover

➤ FORTY boy and girl winners, the year's top talented young scientists of America, attended the five-day Science Talent Institute in Washington (Feb. 27-March 2) as the culminating event in the Science Talent Search for \$11,000 in Westinghouse Science Scholarships. This educational event is conducted by the Science Clubs of America, administered by Science Service.

Upon their arrival in Washington, the young scientists were welcomed at the White House by Mrs. Truman, as shown on the cover of this week's SCIENCE NEWS LETTER.

This issue of the SCIENCE NEWS LETTER contains some of the addresses made by leading scientists. Further coverage of the Institute's activities will be reported in the next issue when the scholarship winners will be announced.

New Branch of Astronomy

➤ RADIO broadcasts to and from the heavens have opened up a new branch of astronomy, Dr. Harlow Shapley, director of the Harvard College Observatory and president of Science Service, told 40 young scientists of tomorrow.

The scientist told the winners of the Seventh Annual Science Talent Search that radio and electronics are bringing new discoveries to the oldest of the sciences, astronomy.

Dr. Shapley, Dr. Wendell M. Stanley of the Rockefeller Institute for Medical Research, and Dr. Karl Lark-Horovitz, head of the department of physics at Purdue University, discussed "Great Future Problems of Science" as guests of Watson Davis, director of Science Service, on Adventures in Science, heard over the Columbia network.

The Harvard astronomer said that microwave or radio astronomy of the future included exploration of the ionosphere and its various layers, measurement of the heights, numbers and motions of the shooting stars in our earth's atmosphere, bouncing of radio waves off the moon, solar noise, cosmic static and cosmic radiation.

Reflecting radio waves off the moon "is not nearly as silly as it sounds," Dr. Shapley cautioned the high school scientists, "because this two-way connection with the moon will help us explore our own upper atmosphere and especially the so-called empty space between the earth and the moon."

The astronomer disclosed that he hopes to use radio noises from the region of the constellation, Sagittarius, in the Milky Way as a part of an exploration of the "Hub of the Universe," which lies more than 20,000 light years away.

Not only is this region sending us the light of billions of stars, but it apparently is broadcasting in the 10-meter band, Dr. Shapley said.

Dr. Stanley, a Nobel prize winner in medicine and physiology, told the science-minded high school audience that studies on viruses may not only help fight disease, but they may also solve

some problems relating to the nature of life.

Conservation Necessary

➤ "YOUNG people who will be among the leaders in science tomorrow must share in the responsibility for the conservation movement which will be necessary for our continued progress and prosperity."

This challenge to leadership in science outdoors as well as science in the laboratory was laid before the 40 finalists in the Seventh Annual Science Talent Search by Dr. Clarence Cottam, assistant director of the U. S. Fish and Wildlife Service.

At present, Dr. Cottam stated, our wildlife resources are declining decidedly in such items as waterfowl, grouse, pheasants, muskrats and rabbits, while at the same time the population of crows and such carnivores as coyotes, mink, foxes and raccoons are building up to a peak. These imbalances are not always due to over-shooting by sportsmen, he pointed out; desirable wildlife populations may be decimated through changing uses of the land, such as cutting down forests and planting crops in the cleared land, drainage of marshes



ON THE BEAM—This shows the group of high school winners at the broadcasting studio where leading scientists answered their questions about astronomy, viruses and physics.

and shallow lakes, and clean cultivation with the eliminating of game-sheltering brushy corners and fencerows.

"The best approach to maintaining high population of fish and wildlife is by natural means," Dr. Cottam declared. "Artificial propagation usually is comparatively inefficient and expensive."

Shapes of Molecules

➤ "TELL me what shape you are and I'll tell you what you can do" might well he said of many molecules, especially the larger ones. Foreknowledge of a compound's properties through a study of the shapes of its molecules was explained to the winning group by Prof. Hugh S. Taylor, dean of the graduate school at Princeton University.

Silk, for example, is a liquid with soluble molecules while it is in the silkworm's glands. Prof. Taylor said, but as soon as it has been spun it solidifies into an insoluble condition. Study of the fibroin molecules that are the basis of silk shows that they are elongated affairs, divided into thirds by hinged joints. When they are folded up like a carpenter's rule they are soluble; during the spinning process they become stretched out and achieve insolubility.

Art Affected by Science

➤ MODERN ART, such as a Picasso picture, arises from the influence of Einstein's theory of relativity, just as surely as the atomic bomb's conversion of mass into energy stems from another Einstein discovery.

National Gallery of Art lecturer Grose Evans finds that art, like the rest of the world, is affected by advances in science and technology.

Explaining the interrelations of art and science to the 40 Westinghouse scholarship winners in the Seventh Annual Science Talent Search, Mr. Evans said that art and science are far more separate today than centuries ago. In earlier times there was a confusion between the two, today art and science are distinct.

"An artist is a scientist in recording appearances," Mr. Evans contended, "whereas the physicist or chemist is little concerned with how things look."

The generally-accepted diagram of the atom is an outstanding example of the way scientists attempt to render compre-

hensible something we cannot really perceive. We cannot really paint a picture of an atom because it is beyond our experience, he stated. The result is that the diagram does not look like the atom, but it does help us understand the atom.

Examples of scientists who were also among the world's greatest painters are Leonardo da Vinci and Albrecht Durer. The art of both was influenced by their scientific interests.

Through proportion, "the magical rule of numbers" crept into art, Mr. Evans said. Leonardo believed that all figures should be geometrically exact and fitted them into geometric designs. Durer, particularly in his earlier work, attempted to draw a normal person then analyzed the figure to work out geometrical principles.

Modern conceptions of space and the universe have influenced modern art, Mr. Evans pointed out. The Copernican system, which placed the sun rather than the earth at the center of the solar system, and the Einstein theory of relativity both have been reflected in the art of their times.

Need for Basic Research

➤ DON'T specialize too soon or too narrowly, and when you do concentrate on one research subject let it be one of the basic sciences rather than something of apparent "practical" application. This advice was given to the 40 winners of the Seventh Annual Science Talent Search by a veteran of an earlier Search, Raymond Schiff, who won the \$2,400 Westinghouse Grand Science Scholarship in 1943.

Mr. Schiff practices what he preaches, for at Harvard, where he graduated last year, his major was nuclear physics. He is at present a junior engineer in the Westinghouse Research Laboratory at Pittsburgh, but intends to begin graduate work at the University of Illinois next September.

No matter how earnest a student may be in pursuit of his science, said Mr. Schiff, he must not let it absorb him completely. He cited the case of one intense fellow-student who considered all courses outside his own special line of interest as "the bunk" and avoided them accordingly. Later he realized how lopsided he had made his training. A properly planned college career, the speaker declared, includes not only a good assortment of "cultural" courses

but a reasonable amount of extra-curricular activities and social contacts.

The widely accepted notion that scientists are dry-as-dust recluses never was true for most of them, he asserted. The recluse scientist was always an exception, and he is becoming scarcer all the time, now that the world has realized the great importance and value of science in both war and peace. The really successful scientist is one who has learned to get along with people; he is a social and a political being as well as a scientist.

The scientist must be a functioning citizen if he is to survive as a scientist, Mr. Schiff continued. Science, he emphasized, can flourish and advance only in an atmosphere of freedom; under too strict control from any source it wilts and dies. The scientist's fellow-citizens are now in the mood to defend and promote science, but they cannot be reasonably expected to do much on behalf of science unless the scientist himself participates in their efforts.

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GENERAL SCIENCE

Winning Science Students Are of Mixed Parentage

➤ AMERICA'S traditional function as melting-pot of nationalities seems to have operated strongly in the parentage of the 40 top-flight high school seniors who were in Washington from Feb. 27 through March 2 for the finals of the Seventh Annual Science Talent Search for the Westinghouse Science Scholarships.

Although a majority of the 40 are of native American stock on both sides, it is not at all a large majority. Twenty-five of the students state that both their parents were born in this country; four have one native-born and one foreign-born parent each, and 11 are of wholly immigrant parentage.

Five of the winners were themselves born in Europe: One is Miss Ursel J. Blumenheim of Forest Hills, N. Y., who comes from Germany. Three New York boys were born in what was the Austro-Hungarian empire before World War I: Gerhard Rayna, who is of Hungarian stock; Walter J. Scheider, who was born in Czechoslovakia; and Kurt W. Kohn, born in Austria of Polish-Czechoslovak parentage.

The foreign-born parents represent a wide range of nationalities. Four of them came from Russia and four from Poland. Three each were born in Czechoslovakia, Greece and Hungary,

and two each in Armenia, Austria and Germany. France, Turkey and Yugoslavia are represented by one parent.

Small families are the rule. Among the 40 winners, 11 are only children, and 15 have only one brother or sister. Eight belong to three-child families, and two to families of four children. One girl and one boy can boast of four brothers or sisters each.

Professions of the fathers are highly varied. The list includes engineer, manufacturer, farmer, salesman, forester, patent agent, machinist, real-estate broker, restaurant manager, optometrist, builder, radio operator, export manager, wood technologist, accountant, appraiser, elevator manager, sheet-metal worker, missionary, teacher and school executive. Two paternal occupations have a unique look: green chain grader, and research analyst for the War Crimes Commission.

Twelve of the students' mothers have occupations outside their homes. Professions represented are teacher, musician, missionary, designer, editor, secretary, bookkeeper, social worker, sales clerk and corsettiere.

Four of the winners have only one parent living. Approximately 62% of the winners' fathers and 52% of their mothers attended college.

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GENERAL SCIENCE

Big-Game Hunting, Flying, Not for Modern Youth

➤ WHAT has happened to the boy who used to want to be a high-altitude flyer, an African big-game hunter or Antarctic explorer "when he grew up"?

Apparently, he is being replaced by a sober group of young people who value service to mankind higher than any other factor in the choice of a job. Boys—and girls too—today want a chance to continue in the same position year after year. They want to feel that they can work themselves up. They are concerned about the effect of the job on their health.

This new view of the ambitions of high school boys and girls and those in grades seven and eight is disclosed by a survey of more than a thousand students made by Dr. R. W. Edmiston of Miami University and Supt. C. H. Starr of the Arcanum, Ohio, schools.

Adventure is pushed down to the bottom of the list of considerations important in picking a job. Kids nowadays don't want adventure—or say they don't. Neither do they want public acclaim.

Or responsibility.

What they do want is security and freedom from political strings. And even

those who would like a chance to travel want to be able to get home at night.

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MEDICINE

Skin Glow Test for Drugs

Persons suffering from such allergic conditions as hayfever or asthma can have the anti-histamine effect of new remedies determined by this method.

➤ A SKIN glow test for new drugs being developed as possible remedies for hayfever, asthma and other allergies is announced by Drs. Samuel C. Bukantz and Gustave J. Dammin of Washington University School of Medicine, St. Louis.

The test will determine the anti-histamine effect of the new drugs. Histamine is a chemical normally present in the body but when freed from its bound state in the body cells acts like a powerful poison and can produce severe shock. It is thought by many scientists to be the agent responsible for the symptoms in various allergic conditions. Many efforts to find chemical cures for allergies have been directed toward making drugs with an anti-histamine action.

The St. Louis scientists discovered, in the course of studies on sensitive, or allergic, states that when the dye, fluores-

cein, and histamine are injected into the forearm skin of normal persons, the skin glows under ultraviolet light for only four to 10 minutes. When the dye, fluorescein, alone is injected, the skin glows under ultraviolet for 30 to 40 minutes. And when fluorescein, histamine and an anti-histamine drug, benadryl, are injected, the skin glows for the same 30 to 40 minutes.

A test on a person with an allergy also showed the anti-histamine effect of the drug, benadryl. With fluorescein alone there was only a four-minute glow. With fluorescein plus histamine there was also only a brief period of glow. But fluorescein plus histamine plus benadryl gave fluorescence for 25 minutes, showing, the scientists state, "the neutralizing effect of the anti-histaminic drug." (*Science*, Feb. 27).

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SCIENTIFIC WORLDS TO CONQUER—Dr. Wendell M. Stanley of the Rockefeller Institute for Medical Research, a Nobel prize winner in medicine and physiology, told these future scientists that many problems are waiting for them to solve.

FORESTRY

Hardwoods Will Yield Pulp With New Process Method

➤ PAPER PULP from southern New England and New York hardwoods is possible with a new process developed at the Polytechnic Institute of Technology, the Technical Association of Pulp and Paper Industries was told at a New York meeting by Dr. Robert S. Aries of the Institute staff.

The process consists of treating the oak, hickory and other hardwoods with soda ash and sulfur dioxide, followed by a method of mechanical grinding. Besides making hardwoods available for pulping, this method, since it involves only mild chemical treatment, results in a much higher yield of pulp than conventional methods of pulping. These conventional methods rid the woods of the greater part of the lignin. Normal pulp yields are about 50%; with the new process 75% becomes pulp.

The pulps obtained from hardwoods are particularly suited for making high quality rayons, cellophane and plastics products. There is an extensive oak-hickory area within a few hundred miles of New York.

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PSYCHOLOGY

Breakup of Marriage Less Prevalent Among Educated

➤ DOES education break up marriages?

In an effort to answer this question, Prof. William F. Ogburn, of the University of Chicago, studied Census statistics. Divorces, he found, increase with education up to the college grade where the tendency is reversed. The figures, expressed in percentage that the number of divorced men aged 30 to 34 is of married men living with their wives, are as follows: Fourth grade or less, 1.7. Seventh and eighth grades, 1.9. High School graduates, 2.1. College graduates, 1.3.

For women, the figures are more striking: 2.6, 2.7, 3.7, and 3.3.

But the picture is quite different, Prof. Ogburn found, if you count all men whose wives are not present and accounted for in the home.

"It may be," Prof. Ogburn suggests, "that the persons interviewed do not always report when they are divorced."

At any rate whether the couple are "separated" but not yet divorced, or whether the wife is working in another

place, traveling in a foreign land, in prison, in a hospital of some kind, or just missing, if she is not there the marriage may be considered as broken.

In this case, the higher the education the fewer are the homes with wives absent. The figures for men in the 30-34 age group are: 4.6 for fourth grade or less as against 3.2 for high school and 2.9 for college. For seventh and eighth grades the percentage is 3.8.

The corresponding figures for women show the same tendency for families with higher education to have fewer homes broken by separation: 6.1, 3.9, 3.1, and 3.1.

Even when the figures for divorces are combined with those for absent wives, the figures show the same downward trend with higher education—6.3, 5.7, 5.3, and 4.3. For men in the same age group (30-34), whose wives are absent or divorced, the percentage of those with less than a fifth-grade education is about half again as great as for those with a college education.

But Prof. Ogburn cautions against assuming that it is the education that holds husbands and wives together. It is known, he points out, that in general the better educated also have larger incomes. It could be that it is the higher income rather than the education that keeps the family together.

"The few indications I have been able to find in the Census data," he states, "suggest a closer relationship of family unity with high income than with high education."

Details of Prof. Ogburn's study will be reported in the *American Sociological Journal* in May.

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VETERINARY MEDICINE

Sulfa Drug Successful Against Poultry Disease

➤ A SULFA drug, sulfaquinoxaline, has been successfully used in the control of one of the most destructive of poultry diseases, coccidiosis, by a three-man research team at the Rhode Island State College, Kingston, R. I.

The drug, designated as "SQ" for convenience, was given to diseased birds in their feed. While untreated flocks suffered a 17% loss, the mortality among treated birds was cut to 2% or less.

The research team, consisting of Drs. L. C. Grumbles, J. P. Delaplane and T. C. Higgins, report their results in the journal, *Science*, (Feb. 20).

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IN SCIENCE

PHYSICS

Scientist and Young Son Work on Watch Experiment

➤ A FAMOUS scientist and his 15-year-old son have made measurements which prove some old advice about handling your watch.

The advice is not to hang your watch up on a wall or bedpost. And this is especially important for the watch repairman who may hang your watch up when he is regulating it.

If a watch is hung up where it can swing freely, it may behave like a pendulum. And it can gain or lose as much as 10 to 15 minutes a day, new scientific experiments have shown.

The scientists who made the tests with watches are a unique father-son team. Dr. Edward U. Condon is director of the National Bureau of Standards and a famed atomic scientist. His eldest son, Paul, 15, is now in the ninth grade at Alice Deal junior high school in Washington, D. C.

About 10 years ago, Dr. Condon recalls, he read how the famous English scientist, Lord Kelvin, had discovered that his watch lost or gained because he hung it up on a bedpost at night. Dr. Condon thought it would make an interesting experiment to measure this pendulum effect. But he could not find the time to run the experiments.

Last summer, Paul, then 14, "wanted something to do," his father explains. So his dad gave him the problem of the swinging watches.

Paul worked without pay in the time section of the Bureau's metrology division during the vacation months measuring the oscillations of watches. The results were reported to scientists in a technical paper published in the *American Journal of Physics*. (Jan.).

The modest father denies that his son is anything more than a "regular boy." Currently, the young scientist is interested in photography, but his father is not ready to predict that the boy will grow up to be a scientist.

If you see watches swinging in a case on your watch repairman's wall, they may only be awaiting repair, Dr. Condon says. But if they are swinging when they are being regulated, the watches may lose or gain.

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THE FIELDS

GENERAL SCIENCE

Atomic Educational Group Needs Funds to Carry on

➤ IT COST \$2,000,000,000 to build the atomic bomb, but a group of politically-conscious scientists, including many who worked on the atomic project, are finding \$2,000 difficult to obtain.

The scientists, organized into the Federation of American Scientists, have been trying to make the American public "atom-conscious" and keep both scientists and laymen informed about such problems as atomic controls.

Now the Federation is threatened by a lack of funds.

"The instrument of the scientists for action in public affairs will be lost unless at least \$2,000 is obtained beyond the dues in the next two months," a statement explained.

"It is true the international scene looks dismal, but it would look far worse, if Congress and the people see that 'even the scientists have quit!'" the Federation appealed.

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ARCHAEOLOGY

Indian Occupation Sites Discovered in Dam Areas

➤ MORE than 20 extensive sites of former Indian occupation have been discovered already in a survey of areas to be flooded for dam projects on the Savannah River in Georgia and South Carolina, the Smithsonian Institution reported.

Two scientists of the Institution, Carl F. Miller and Joseph R. Caldwell, made the discoveries at the Clark Hill project, just north of Augusta, Ga. Work on the project is underway, but scientists hope that extensive excavations may be made before the area is flooded.

Archaeological exploration of the Clark Hill area is the first of a series of studies which will be made in prospective lake sites on the Savannah. Other projects include Anthony Shoals, Tallow Hill, Goat Island, Middleton Shoals, Hartwell, Old Pickens and Newry Dam.

The region is little-known before the time of the early colonists. At the be-

ginning of the Christian Era, wandering hunters are believed to have lived along the Savannah River. Agriculture and village life were probably not introduced until a few hundred years before Columbus, when Indians from the Mississippi Valley came to the area.

Details of the cultures of the Savannah are buried in the sites which scientists hope to uncover before the locations are buried under man-made lakes.

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PHYSIOLOGY

Freeze-to-Death Test Shows Pigeons Toughest

➤ RATS and mice freeze to death rather easily, but pigeons hold out much longer. These are among the results of a series of experiments with various warm-blooded animals, carried out in the Cold Room of the Harvard Fatigue Laboratory by a four-man team working for the Army Quartermaster Corps.

Mice, rats and rabbits, canaries, pigeons and chickens were placed in cages kept at a temperature of about 35 degrees below zero Fahrenheit, and the times it took for them to die were carefully recorded.

Mice succumbed most quickly, dying in less than 25 minutes. Canaries were next, surviving for only 36 minutes. White rats lasted from three-quarters of an hour to two hours. Some rabbits died in three and one-half hours, while others held out for as much as six and one-half hours.

Great spread in survival-time was shown by white Leghorn chickens. Some of them died in less than three and one-half hours, but "toughies" managed to stay alive for 29½ hours.

Most resistant of all the animals tested were Army carrier-pigeons. None died in less than 22 hours, and one lived for 78. This resistance in pigeons, incidentally, may offer a clue to the high survival of half-wild park pigeons under tough city conditions.

None of the animals hopped or fluttered around in an effort to keep warm.

The research team consisted of Dr. S. M. Horvath of the University of Pennsylvania, Dr. G. E. Folk of the Quartermaster Corps and Drs. F. N. Craig and W. Fleischmann of the Army Chemical Center. The work was done as a function of the Environmental Protection Section, Research and Development Branch, of the Quartermaster Corps., and was reported in *Science* (Feb. 13).

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ELECTRONICS

New Rectifier Tube Contains Cesium Vapor

➤ A NEW highly-efficient rectifier tube to change alternating electric current to direct current contains the vapor of cesium metal and has its cathode surface of cesium coated on nickel, General Electric reveals.

It has long life, and gives better than 98% efficiency, compared with 94% in some of the rectifiers now in common use, according to Dr. Albert W. Hull, under whom it was developed in collaboration with E. E. Burger and R. E. Turrentine of GE research laboratory.

The emission of electrons from the cesium, coated on the nickel surface, even at relatively low temperature, is one of the most copious known, Dr. Hull states. There is no appreciable evaporation of the nickel, and the coating of cesium is continually renewed from the vapor in the tube.

Cesium is a silver-white metallic element belonging to the potassium family. It gives up one electron more readily than any other element, hence its use as the light-sensitive film in photo-electric cells.

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ASTRONOMY

Paths of Major Planets To Be Calculated Exactly

➤ THE paths followed by Mars, Venus and the other nine major planets will soon be exactly calculated. The most modern electronic calculators yet developed will be used for this huge, long-range research project, states Dr. Dirk Brouwer, director of the Yale University Observatory.

So extensive are the calculations involved that the United States Naval Observatory, the Watson Scientific Computing Laboratory in New York and Yale University have entered into a cooperative enterprise with the support of the Office of Naval Research.

The study of the motions of the major planets, begun at Yale last year, will be speeded up through use of the latest in calculators, the Selective Sequence Electronic Calculator announced only a few weeks ago. Theories of astronomy which have been in existence for the past 50 years have been augmented by an accumulation of accurate observations. A new investigation should considerably improve our knowledge, Dr. Brouwer reports.

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NUCLEAR PHYSICS

"Much Shall Be Required"

Well-qualified youth is needed in all fields of science, 40 boys and girls were told at the Awards Banquet, which culminated the Science Talent Search.

By W. W. WAYMACK,
Member, U. S. Atomic Energy Commission

Excerpts from an address delivered at the Awards Banquet of the Science Talent Institute in Washington, D. C.

➤ WHAT I have to say this evening is intended primarily for just 40 persons in this large room. The rest of you are welcome to listen if you choose. But for good and obvious reasons I am addressing directly the 40 youngest members of my audience.

To you fortunate 40, however, I am speaking only because you are representatives of all young people of your age and interests in the country. You are here only as the lucky survivors of a particular screening process.

The permanent task of running the Atomic Age is appropriately one for youth. We present members of the Commission must acknowledge ourselves to be venerable—we average 51 years. But we are deliberately building an organization of young men to enable us to deal with new problems of great complexity and of immeasurable importance to all our people.

In this procession of essential youth, places are reserved for you and other science-minded young men and women like you.

Youth and Revolution

The war-hastened birth of usable atomic energy is generally recognized as a revolution; and young people are traditionally the riders of revolution's wild horses.

I do not need to stress to you that our primary needs, for the long pull, is not the guarding of "The Secret", as I sometimes find necessary in addressing audiences of your elders. You know without needing to be told now that while much information about our atomic energy development must necessarily be kept "restricted" (official gobbledegook for various grades of secrecy) the basic facts of atomic physics have been in the books, foreign as well as American; for some years. Anybody who

can read a page of modern physics or mathematics can learn of the fundamental contributions of Niels Bohr, and Fermi, and Szilard, and Meitner, and Einstein and all the rest.

Yet in another respect, and a very important one, all these openly published works are in a restricted category. For only the educated eye can read these pages and only the trained mind can understand their contents. The number of persons who have seen an atom bomb, or helped to put one together, is not large. Even so, it may possibly be larger than the number of Americans who have a really good reading knowledge of the scientific language in which the underlying facts of all atomic energy are stated. We have altogether too few such trained minds. We must find more of them, and soon, among the young men and women who are now in high school and college.

Need of Scientists

Refilling the ranks of atomic scientists is of course not the only responsibility of today's science-minded and science-talented young people. The world has need of workers in the whole alphabet of the sciences, from astronomy to zoology, in fields not yet touched by atomic energy as well as in those already being revolutionized by it, and in all the varied applications of science—medicine, engineering, agriculture, forestry, and all the rest. The harvest is indeed great, and the laborers far too few. It is to be hoped that public aid and private aid, too, for the training of scientists and the support of their research will soon vastly extend the field which the Science Talent Search has so brilliantly pioneered.

The Atomic Energy Commission, appreciating the importance of building up a corps of thoroughly trained young scientists in fields affected by the utilization of atomic energy (and that means, or seems likely soon to mean, just about all fields) has undertaken to do some searching on its own account for science talent at the college-graduate level. Al-

together we expect to offer graduate fellowships to 355 young men and women, most of them in their second or third year of graduate work, but some already with their doctors' degrees. A total of \$2,500,000 has been set aside for the first year of this program.

Let me give you a quick sketch of the responsibilities and activities of the Atomic Energy Commission:

The Congress and the Executive of the United States, by the law that became effective on August 1, 1946, made the development and use of atomic energy in this country a government monopoly. It set up the Atomic Energy Commission, and provided for a General Manager and his staff working under the Commission.

A.E.C. Responsibilities

On the Commission was put responsibility in the whole range of atomic energy, from the procurement of raw materials wherever they might be reached on earth to and including the production of atomic weapons, to and including the development of power for peaceful uses, to and including the then unforeseeables. The Commission, for the people of the United States, owns and controls all fissionable materials. It owns and directs operations of our atomic energy industry, which produces fissionable materials. It controls information as well as materials, much of the information necessarily being kept secret. It is under orders to conduct atomic energy research on a great scale and with real drive, and to see that research is pressed by others with its aid. Its real job, almost incredibly complex, is to get ahead, all along the line.

We have four main installations and rather numerous smaller ones. Three of them, largest and most conspicuous, are primarily production plants and one is a proving ground. At Oak Ridge, Tenn., which was and is the largest of those strange anomalies, "company towns" owned by the government, the principal production activity has been the separation of uranium 235 from its more abundant isotope, uranium 238. At the Hanford, Wash., plant some uranium 238 is converted into plutonium. The Los Alamos, N. M., plant is the one place where atomic bombs are made;



W. W. WAYMACK

naturally I can't talk about that. And far out in the Pacific, at Eniwetok atoll, is the new proving ground for routine tests.

Production of fissionable materials is by no means the only activity at Oak Ridge. It is also a great research center, one of three national atomic research laboratories, involving participation of both industry and universities. The two other national laboratories are the Brookhaven laboratory on Long Island, operated by a group of Northeastern universities, and the Argonne laboratory near Chicago, in which 29 universities participate.

Radioactive Materials

In one part of the National Laboratory at Oak Ridge intensive work is being done on methods and means for safeguarding the health of persons who work with radioactive materials—and they are dangerous, as X-rays are dangerous, or radium. A fine record of safety in this work, I may add, has been made.

Another of the Oak Ridge laboratory establishments is the recently opened Biological Laboratory, where a staff of brilliant researchers are pioneering in work on the effects of fissionable materials and their radiations on living animals and plants. Still another is the center for distribution of radioactive and stable isotopes for research in university and other research laboratories both in this country and abroad. We sell radioactive isotopes of a large number of chemical elements to institutions need-

ing them in their research problems. Requests for radioisotopes are reviewed and approved by a special allocations committee, and in case of foreign distribution a progress report on the results of the investigations is required every six months.

At Berkeley, Calif., is another very important laboratory, the "Radiation Lab," which has done magnificent things in the past and which will do more of them in the future. At Iowa State college, in my own state, work of which the same could be correctly said, goes on with our support. These are not all; but I am not trying to be comprehensive.

Wide Range of Research

Thus you will see that research in atomic energy, all phases, is being conducted on a wide range of bases, from work requiring large teams of men and the most massive facilities, available only in one or a few places, to one-man problems in small colleges or remote agricultural experiment stations. Some of the problems are so involved with national security that their very nature cannot be discussed; others are so open that you can go and kibitz over the researcher's shoulder—if he'll let you.

I have already mentioned research on atomic power. I can't be very specific about possibilities here, except to say that immediate application is not in prospect, and that when it does come it seems likely to be in rather large-scale installations. Stationary power plants, especially where conventional steam and water power are not cheaply available, and perhaps propulsion for warships, are the likeliest initial efforts. Some rather difficult but, we believe, not insuperable problems have to be solved first, and those we are "at."

We have certainly progressed if we are able to work toward the use of this newly available form of energy for constructive purposes within a couple of years after its first use for destructive purposes. Remember, the first use of expansive thermal force confined within a cylinder was to push cannon-balls, and it was about 400 years before people got around to using the same force in the modified form of steam to push a piston to do useful work, and more than 200 more before an engine directly utilizing explosions was developed. So you really shouldn't be impatient about our slowness in developing atomic power.

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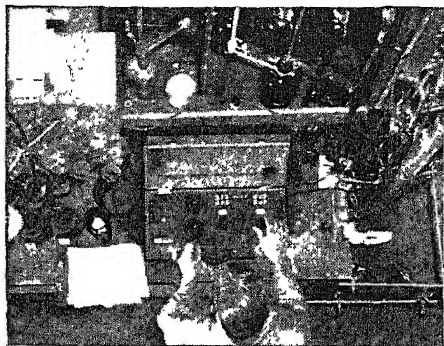
Chlordane is an American-made insecticide effective in killing grasshopper invasions.

A new plant-growth inhibitor, and possibly a *weed-killer*, has been obtained from a Southwestern desert plant called brittle bush.

Household *moth larvae*, that damage clothing, are hatched summer and winter, but the time required to hatch the eggs of the moth is greater in cold weather than when warm.

The plant that produces *mace*, widely used spice, produces nutmeg also; mace is the covering which envelopes a part of the shell of the nutmeg and one can not be grown without the other.

A chemical compound, relatively new commercially, is claimed as a valuable aid in soaps and detergents to make white clothes stay white longer; it is sodium carboxymethyl cellulose, called *Sodium CMC* for short.



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present is the indirect one involved in the employment of what is becoming known, even in everyday discussions, as "tracers." Exposing chemical elements to bombardment with atom-particle streams of various kinds renders them, in turn, radioactive. Thereafter they can be detected, even in smaller quantities, by instruments such as Geiger counters or electroscopes, or in some cases simply with photographic film. Compounds of these radioactive elements can thus be traced wherever they go, which is why they are called tracers.

Tracer Elements

Tracer elements have been a godsend to plant physiologists, and to that outdoor application of their science which we call agriculture. So seemingly simple a thing as the rise of sap in plants has for ages been a riddle; we did not know how fast it went, with any real accuracy, and we did not know at all what paths it followed. Now we are beginning to find out. An even denser mystery surrounded the making of sugars, starches and other foods in the green leaf, on which we all depend for our very lives. Now we prepare radioactive carbon, burn it to make carbon dioxide, feed this to a plant leaf on which light is shining—and the tracers start telling their story. There had long been dispute as to whether starch came first and was changed into sugar, or sugar came first and was changed into starch. Tracers have shown both theories to be wrong; the initial stage in food-making is neither starch nor sugar but a third something that has not yet been completely identified.

Of particular practical value has been the use of tracers in the chemical mixtures that are commercial fertilizers. Plant nutrition, especially under outdoor conditions, has always had more guesswork in it than we liked to admit. Tracers are beginning to tell us when we are wasting one chemical by putting in too much of it, or leaving the plant technologically unemployed by not giving it enough of another to let it work at full efficiency.

Important though tracers are, they are not the only way in which the new radioactive elements can be used. It has been known for some years that bombardment with X-rays and exposure to radium can change the germ-cells of animals and plants, producing hereditary changes in the offspring. The same kind of thing can now be done much more cheaply with radiations from our

atomic ovens. What this may mean to genetical science and practical plant and animal breeding is for the future. It may be considerable. There are also possibilities in the radiation treatment of diseases. They may be of tremendous importance. But all we can say now is "may be."

Well, these are a few random samples of the research uses that are now being made of atomic energy and its products, the fissionable isotopes of the elements. They look impressive as they pass in review, but really they represent only a small fraction of the possibilities. There simply aren't enough workers now.

Here is where you come in. I have several times addressed you as the fortunate 40. Fortunate you are. Not because you are here, but because you have the intelligence and aptitude that have enabled you to pursue your education thus far with credit, and can reasonably be expected to make good use of your further opportunities.

Good fortune is yours. Responsibility is also yours, proportionate to your proven abilities. "For unto whomsoever much is given, of him shall much be required; and to whom men have committed much, of him they will ask the more."

Science News Letter, March 6, 1948

Science Service Radio

► LISTEN in to a discussion on brains of animals and humans on "Adventures in Science" over Columbia Broadcasting System at 3:15 p.m. EST Saturday, March 13. Dr. Ralph Gerard, professor of physiology of the University of Chicago, will be the guest of Watson Davis, director of Science Service. Dr. Gerard is going to explore the brain and try to tell us what makes us think.

Science News Letter, March 6, 1948

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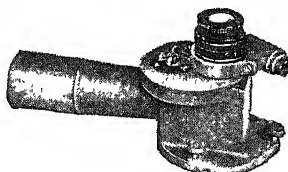
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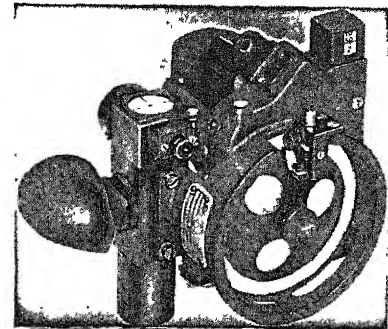
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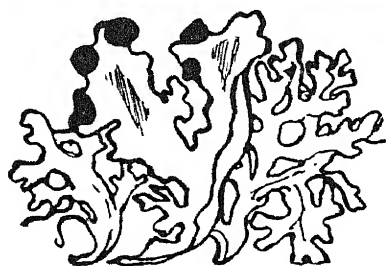
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Martian Plants

➤ **LICHENS** got their first widespread airing over the radio recently, when some astronomical observations on Mars were at first "interpreted" by non-scientific writers as proofs that plant life at the level of lichens and mosses existed on our neighbor-planet. Most radio commentators, incidentally, mispronounced the word "lichens," making it rhyme with "kitchens"; the accepted pronunciation is exactly like that of the common verb, "likens".

The general climate of Mars has been most aptly compared to that which would exist at the top of a desert mountain twice the height of Everest. Nothing much there, it would seem, to support rich vegetation; certainly nothing to supply the manifold needs of a high human civilization, such as romancers have pictured on Mars. Lichens, however, might survive. They are the earth's toughest

plants, first to appear on barren rock anywhere on earth, whether it be under the blazing Sahara sun or on the bleak nunataks of Greenland.

To imagine lichens on Mars, however, requires the acceptance of not one kind of plant but two. For a lichen is not a single plant like a buttercup or a mushroom; it is a fairly complex colony consisting of two quite different kinds of plants. It is a close web of colorless fungus threads holding within it swarms of one-celled lower plants known as algae. Often they are the same kind of plants that, growing alone, form green film on the bark of trees in moist places and are often though erroneously called "moss".

This intimate mutual entanglement of two different kinds of plants is often pointed out by biologists as a good example of what they term "symbiosis". That difficult-looking word is simply

Greek for "living together." It is used to describe the close association of any two different species where both appear to derive some benefit, and both make their contributions to the common welfare. It doesn't always work out as ideally as that, but at any rate that is the theory.

These masses of fungi and algae that assume the distinctive forms we know as lichens are of three different main types. There are crustose or crust-forming lichens, that look like daubs of dried paint, some of them brilliant reds and yellows. There are foliose or leafy lichens; "rock tripe" is one common name applied to them. Finally, there are fruticose or twiggy lichens, best exemplified in the familiar reindeer moss, and in the "moss" that beards the murmuring pines and the hemlocks in the prelude to Longfellow's *Evangeline*.

Science News Letter, March 6, 1948

BOTANY

Chlorophyll Has Disk Form

➤ **CHLOROPHYLL**, the green pigment in plants on which all life ultimately depends, comes in almost ultramicroscopic little disks or wafers, held together in groups of from 40 to 60 by a structureless matrix. Electron microscope studies confirming these structural details have been made by Drs. Sam Granick and K. R. Porter of the Rockefeller Institute for Medical Research, New York.

Easily visible under even moderate powers of the ordinary compound microscope are the saucer-shaped larger green bodies known as chloroplasts, which in turn are made of masses of these newly explored smaller units, known technically as "grana".

Existence of the grana was suggested a number of years ago, on the basis of studies with the highest powers of the ordinary microscope. However, because each individual granum has a diameter only slightly greater than one wavelength of visible light, they could be only just barely glimpsed by that method. Not until the enormously higher magnifications of the electron microscope became available could further research be carried on.

Drs. Granick and Porter used ground-up chloroplasts of spinach in their studies. Minute drops of the green suspension were placed on thin transparent films and carefully dried, then exposed to the electron microscope beam and

photographed. Some of the preparations were given an exceedingly thin coat of gold, and this delicate metal "cast" used in further study and photography.

Diameters of the grana average about 6000 Angstroms, and their thickness is approximately one-eighth their diameter. (An Angstrom is the unit of measurement for light wavelengths; it is roughly a quarter-millionth of an inch.) Diameters of grana in different groups differ slightly, but all those within a given group are of uniform size.

Chemical studies on this exceedingly minute scale are of course difficult, but the two investigators are now endeavoring to determine in what part of the chlorophyll complex the light-capturing green and yellow pigments are held.

Details of the studies appear in the *American Journal of Botany* (Dec. 1947).

Science News Letter, March 6, 1948



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THE ATOM—Sir George Thomson—*Oxford*, 3d ed., 196 p., illus., \$2.00. This book by the British Nobel physicist has been brought up to date by new chapters.

AUSTRALIAN BIRD LIFE—Charles Barrett—*Oxford*, 239 p., illus., \$3.25. A readable account.

THE BACK AND ITS DISORDERS—Philip Lewin—*McGraw-Hill*, 157 p., illus., \$2.50. Written by a professor of bone and joint surgery especially for persons who have backache or who are candidates for it and also for their relatives and friends.

A BIOCHEMICAL HYPOTHESIS OF THE GENESIS OF CANCER—Louis A. Pinck—*New York Academy of Sciences*, 17 p., paper, 50 cents.

BROADCAST OPERATORS HANDBOOK—Harold E. Ennes—*John F. Rider*, 265 p., illus., \$3.30. Intended for the man in the control room—oldtimers as well as newcomers.

THE BUSINESS OF FARMING—Hertzel DeGraff and Ladd Haystead—*Univ. of Oklahoma Press*, 244 p., illus., \$3.00. A practical book with the emphasis strictly on profits, not romance.

CHILDHOOD AND DEVELOPMENT AMONG THE WIND RIVER SHOSHONE—D. B. Shimkin—*Univ. of California Press*, 37 p., paper, 75 cents.

CHROMATOGRAPHY—Harold G. Cassidy—*New York Academy of Sciences*, 325 p., illus., paper, \$2.75.

DAVID LILIENTHAL: Public Servant in a Power Age—Willson Whitman—*Holt*, 245 p., \$3.00. This biography is, naturally, also the story of TVA.

ELEMENTARY PHYSICAL METALLURGY: With Emphasis on Ferrous Metallurgy—Edward G. Mahin—*Chemical Publishing Co.*, 276 p., illus., \$6.00. For plant workers as well as students.

ENGINEERING APPLICATIONS OF FLUID MECHANICS—J. C. Hunsaker and B. G. Rightmire—*McGraw-Hill*, 494 p., illus., \$5.00. Of prime importance in understanding the action of compressors and turbines and also engines where controlled flow of air, fuel and combustion gases is essential.

EUROPE'S POPULATION IN THE INTERWAR YEARS—Dudley Kirk—*Columbia Univ. Press*, 302 p., illus., paper \$3.50, cloth \$4.00. A League of Nations Publication prepared by Princeton University's Office of Population Research.

FROM FIJI THROUGH THE PHILIPPINES: With the Thirteenth Air Force—Benjamin E. Lippincott and others—*Macmillan*, 193 p., illus., \$10.00. Illustrated by paintings by Robert A. Laessig, the book is of historic and artistic interest.

THE INTERPRETATION OF SPECTRA—William Mayo Venable—*Reinhold*, 200 p., \$6.00.

A LABORATORY MANUAL OF COMPARATIVE VERTEBRATE EMBRYOLOGY—Allyn J. Waterman—*Holt*, 248 p., 63 pl., \$3.50. For the undergraduate.

MATHEMATICS FOR ENGINEERS—Raymond W. Dull—*McGraw-Hill*, 2nd ed., 780 p., illus., \$5.50. A reference book for engineers.

METAL PROCESS ENGINEERING—Norman E. Woldman—*Reinhold*, 291 p., illus., \$5.00. For engineering students.

PHILOSOPHY IN A NEW KEY. A Study in the Symbolism of Reason, Rite and Art—Susanne K. Langer—*Penguin*, 248 p., paper, 35 cents. A reprint of a book originally published by Harvard University in 1942.

A PSYCHOLOGY OF GROWTH—Bert I. Beverly—*McGraw-Hill*, 235 p., \$3.00. A book intended especially for nurses to help them understand their small charges, but also of great interest to parents who want their children to grow up to mentally healthy adulthood.

THE RADIO AMATEUR'S HANDBOOK—Headquarters Staff of the American Radio Relay League—*American Radio Relay League*, 25th ed., 608 p., illus., \$2.00. A "must" for the "ham" or the person who aspires to be one.

RUDIMENTS OF CHEMISTRY: The Chemist's View of the Nature of Matter—Roland M. Whittaker—*Ronald*, 310 p., illus., \$3.00. A college text.

SYMPOSIUM ON MEDICOLEGAL PROBLEMS—Samuel A. Levinson, Ed.—*Lippincott*, 255 p., illus., \$5.00. Under the co-sponsorship of the Institute of Medicine of Chicago and the Chicago Bar Association.

TOOL STEEL SIMPLIFIED: A Handbook of Modern Practice for the Man Who Makes Tools—Frank R. Palmer and George V. Luerssen—*Carpenter Steel Company*, 2d ed., 564 p., illus., \$2.00.

Science News Letter, March 6, 1948

PHYSIOLOGY-PSYCHOLOGY

Tests Show Feeding Hungry Is Step to Less Fighting

➤ SUPPORT for the ERP idea that "feeding the hungry is a step in the promotion of peaceful living" comes from goat studies by Dr. J. P. Scott of the Roscoe B. Jackson Memorial Laboratory of Bar Harbor, Me.

The studies were made to test experimentally the effect of hunger on aggression and fighting in an animal. A flock of goats containing several age groups was used. Hungry animals, Dr. Scott found, do fight more than well-fed ones. But they fight chiefly in situations where they are already in the habit of fighting. The scientific conclusion was: "The training of individuals with regard to fighting is perhaps more important than hunger in determining whether or not they are aggressive."

True of goats, Dr. Scott asks whether it applies to humans.

The animals in the study were not undernourished or actually starving as might be the case in human populations. This, Dr. Scott points out, might change the reaction to hunger.

Comparing dominant and subordinate animals, Dr. Scott found that delayed feeding increases the amount of aggressive fighting in the dominant animals and causes the subordinate animals to take more punishment and thus lower the degree of dominance. But delayed feeding almost never causes aggression in the subordinate animals.

The dominance relationships between males, he also found, appears to be approximately but not entirely the same in cases of sexual frustration as in food frustration.

Considering the results of his studies in relation to the Marshall Plan and our activities in Europe, Dr. Scott suggests that our European policy should probably be considered primarily with regard to the effects of food as a reward and as a means of creating good will.

Science News Letter, March 6, 1948

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• New Machines and Gadgets •

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 404. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

❁ **MEAT TRAY**, for use in oven or refrigerator, is a shallow dish with a high front end on which is a handle. A spiked sheet, that fits into the bottom of it, holds the meat while carving. Fingers are safe from the knife if cutting is made toward the high front end.

Science News Letter, March 6, 1948

❁ **MOTORIZED WHEEL chair**, designed particularly for an infantile paralysis patient, moves forward, backward, or to the right or left, at a slow-walk pace under control of a switch on its arm. The switch can be flipped with a single finger.

Science News Letter, March 6, 1948

❁ **CONTROL BOX**, for use in coal mines near mining operations, cuts automatically the current in the electric power line leading to work machines if an electrical failure occurs in any machine. It lessens the dangers of an explosion by preventing sparking.

Science News Letter, March 6, 1948

❁ **SLIDE PROJECTOR**, for use in country schools and homes without electricity, uses a special mantle lamp that burns either gasoline or kerosene. It can be used with standard lantern slides or film strips, and gives a six-foot-square picture at 20 feet.

Science News Letter, March 6, 1948

❁ **VEGETABLE SHREDDER**, which is also a slicer or grater of fruits as well as of raw or cooked vegetables, is attached to the wall and operated by the



handle below, shown in the picture. Made of a plastic which is easily cleaned, the cutting is done by interchangeable revolving stainless steel disks.

Science News Letter, March 6, 1948

❁ **PORTABLE VENTILATOR**, electrically operated, provides fresh air to men working in confined places. Housed in a lightweight aluminum casing, it operates standing on the floor or hung from above, and can be used either as a blower or an exhaustor.

Science News Letter, March 6, 1948

❁ **ICE STICKS** of a size suitable for sliding into a thermos bottle are made with a new tray which fits into the freezing compartment of the ordinary

refrigerator. The rubber tray, recently patented, contains lengthwise compartments from which the icicles are easily removed.

Science News Letter, March 6, 1948

❁ **IRON-RESTING device**, which can be quickly attached or detached from the ironing board, is an aluminum tray with a corrugated upper surface, and an asbestos pad under it to prevent scorching the ironing pad. Raised edges on three sides keep the iron from slipping off.

Science News Letter, March 6, 1948

❁ **NON-LOSABLE ERASER** for the typist sticks in plain sight anywhere on the typewriter. This recently patented device has a small magnet in the center of the metallic sleeve of an ordinary disk-shaped eraser that holds it where put against iron or steel.

Science News Letter, March 6, 1948

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Question Box

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Photographs: Cover, Westinghouse Electric Corp.; p. 147, p. 149, p. 151, Fremont Davis.

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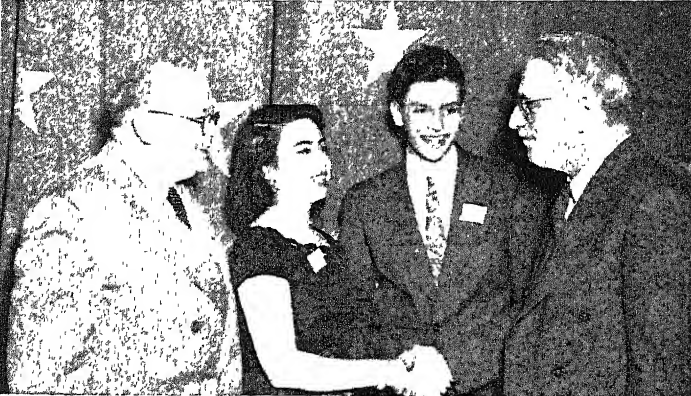
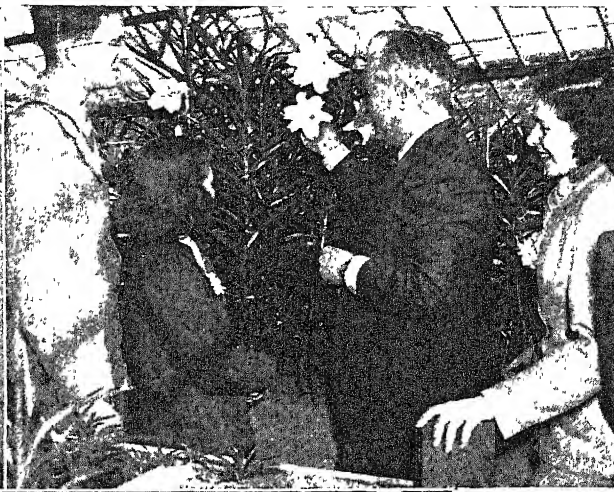
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Scientists of the Future

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A SCIENCE SERVICE PUBLICATION



GENERAL SCIENCE

Top Science Scholarships

Youngest of the finalists, Andrew Kende, improves industrial reagent while his co-winner, Barbara Wolff, studies changes in fruit flies.

See Front Cover

➤ GREATER safety for workers in chemical factories may result from original research by a 15-year-old high school student, Andrew S. Kende of Evanston, Ill., who received one of two \$2,400 scholarship awards at the close of the Seventh Annual Science Talent Search in Washington, D. C.

Recipient of the other grand prize scholarship was Barbara C. Wolff, 17, senior in Forest Hills (N. Y.) High School. Her research project was the study of phenocopies in fruit flies. These are changes in body shape and color resembling mutations, but are produced by environmental influences and are good for one generation only.

Mr. Kende was using, in some of his chemical work, what is known as a Grignard reagent. This is dangerous both to use and to make because its principal ingredients are ether and magnesium—both highly inflammable. Despite their dangerous nature, Grignard reagents are widely used in industry today.

He searched the literature of chemistry for possible records of a safer material to use. Not finding any, he decided to try to make one himself, using something less flammable than ether. He finally succeeded in making workable Grignard reagents with not only one, but three, possible substitutes for the dangerous ether.

Mr. Kende and Miss Wolff, shown on the cover of this week's SCIENCE NEWS LETTER, are two of the 40 winners of the Science Talent Search who have spent five days at the Science Talent Institute conducted by Science Clubs of America, with funds supplied by the Westinghouse Educational Foundation. At the concluding banquet, when their choice as recipients of the two top prizes was announced, \$6,200 in additional Westinghouse Science Scholarships was dis-

tributed among the other 38 contestants.

For all the mental brilliance that has won early distinction for them, these students are not the pale-faced bluestockings that young scholars are sometimes depicted. Miss Wolff is editor of her high school paper, and her club memberships include groups interested in mathematics, microscopy, badminton and cancer research. She likes classical music and modern dancing. Mr. Kende, who is the youngest of the 40 finalists in this year's Science Talent Search, will graduate from high school in three years, by dint of attending summer school straight through. Although his chief interest is in chemistry, his hobbies take a natural-history bent; his outdoor interests include minerals, insects and reptiles.

Science News Letter, March 13, 1948

GENERAL SCIENCE

Winners of Westinghouse Science Scholarships

GRAND SCHOLARSHIPS OF \$2,400

Wolff, Barbara Claire, Forest Hills High School, Forest Hills, N. Y.
Kende, Andrew Steven, Evanston Township High School, Evanston, Ill.

ALTERNATES

Maurer, Laura Caroline, South Side High School, Rockville Centre, N. Y.
Kohn, Kurt William, Bronx High School of Science, New York, N. Y.

SCHOLARSHIPS OF \$400

Maurer, Laura Caroline, South Side High School, Rockville Centre, N. Y.
Alexeff, Igor, Mt. Lebanon High School, Pittsburgh, Pa.
Baraff, Gene Allen, Forest Hills High School, Forest Hills, N. Y.
Howett, Gerald Leonard, Abraham Lincoln High School, Brooklyn, N. Y.
Johnston, Alan Robert, Van Nuys High School, Van Nuys, Calif.
Kohn, Kurt William, Bronx High School of Science, New York, N. Y.
LeSchack, Alan Richard, Stuyvesant High School, New York, N. Y.
Rayna, Gerhard, Stuyvesant High School, New York, N. Y.

Rigal, R. Daniel, Liberty Center Village High School, Liberty Center, Ohio
Yphantis, David Andrew, Public Latin School, Boston, Mass.

ALTERNATES

Zisk, Stanley Harris, Public Latin School, Boston, Mass.
Geller, David Melville, Oak Park Township High School, Oak Park, Ill.
Schaad, Lawrence Joseph, Logan High School, Logan, Ohio

SCHOLARSHIPS OF \$100

Blumenheim, Ursel Joyce, Forest Hills High School, Forest Hills, N. Y.
Childress, Patricia Lee, Alexander Hamilton High School, Los Angeles, Calif.
Decker, Charlotte Elizabeth, Senn High School, Chicago, Ill.
Gilbert, Marjorie Ann, Brodhead High School, Brodhead, Wis.
Rowe, Nancy Jean, Lincoln High School, Canton, Ohio
Sawyer, Millicent Margaret, Wiley High School, Terre Haute, Ind.
Berry, Richard Stephen, East High School, Denver, Colo.
Breslow, Ronald Charles, Rahway High School, Rahway, N. J.
Camamis, George, New Brunswick Senior High School, New Brunswick, N. J.
Coe, Elmon Lee, North Phoenix High School, Phoenix, Ariz.
Dibble, William Edwin, Herbert Hoover High School, Glendale, Calif.
Geller, David Melville, Oak Park Township High School, Oak Park, Ill.
Jamieson, John Burgess, Sewanhaka High School, Floral Park, N. Y.
Koehler, George Edgar, West High School, Madison, Wis.
Lubin, Michael David, Tottenville High School, Staten Island, N. Y.
Martin, Paul, Stuyvesant High School, New York, N. Y.
Mazo, Robert Marc, Flushing High School, Flushing, N. Y.
Miller, Jerry Blair, Lincoln High School, Canton, Ohio
Peacock, Roy Norman, Springfield Union High School, Springfield, Ore.
Poindexter, Edward Haviland, J. W. Sexton High School, Lansing, Mich.
Richardson, James Wyman, Washington High School, Sioux Falls, S. D.
Rodemich, Eugene Richard, Beaumont High School, St. Louis, Mo.
Schaad, Lawrence Joseph, Logan High School, Logan, Ohio
Schneider, Walter Julius, Bronx High School of Science, New York, N. Y.
Shlichta, Paul Joseph, Brooklyn Preparatory School, Brooklyn, N. Y.
Teager, Herbert Martin, Midwood High School, Brooklyn, N. Y.
Wilcox, Charles Frederick, Jr., Greenwich High School, Greenwich, Conn.
Zisk, Stanley Harris, Public Latin School, Boston, Mass.

Science News Letter, March 13, 1948

TOP TEN—Left to right: Kurt William Kohn, alternate boy for the top scholarship; the group visits experimental greenhouses of the U. S. Department of Agriculture at Beltsville, Md.; Laura Caroline Maurer, alternate girl for the \$2,400 scholarship. The top winners are congratulated by Watson Davis and Dr. W. W. Waymack. Some of the group are shown talking with Dr. I. I. Rabi. Winners of \$400 scholarships are: Igor Alexeff, Gene Allen Baraff, Gerald Leonard Howett, Alan Robert Johnston, Alan Richard LeSchack, Gerhard Rayna, R. Daniel Rigal, and David Andrew Yphantis.

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GENERAL SCIENCE

Many Problems Unsolved

Leading scientists point to broadening scientific horizons that require young trained minds in fields of astronomy, medicine and physics.

► THREE leading scientists answered questions about astronomy, viruses, and physics of talented teen-agers over the Columbia Broadcasting System.

This was one of the highlights of the five-day Science Talent Institute held in Washington (Feb. 27-March 2) and attended by 40 boy and girl honor-trip winners. It marked the culminating event of the Science Talent Search for \$11,000 in Westinghouse Science Scholarships. This search is conducted by Science Clubs of America, administered by Science Service.

Dr. Harlow Shapley

Dr. Harlow Shapley, director of the Harvard College Observatory and president of Science Service, informed all high school future scientists that:

The world is very far from finished, and there are many, many problems that we older scientists won't have time to solve or even start to solve. And each new advance in science brings new problems, like the development of atomic energy.

You might think that the oldest of the sciences, astronomy, would have succeeded in two thousand years in finding all the answers. But it hasn't. With our modern telescopes and our modern ideas we have increased the volume of explorable space by a billion times during the past generation; but that big advance does not answer all the problems. In fact, it opens up many that we did not know were in existence. I believe I could talk off now, in the next ten minutes, without referring to a note, 40 investigations in the fields of stars and galaxies, each of which would justify a doctor's degree, if satisfactorily completed. And in the fields of shooting stars, the planets, comets, and especially of the sun and its radiation, there are equally many unsolved problems which we now know how to get hold of.

Also there is being born at this time a new branch of astronomy practically unknown ten years ago. Its triumphs are nearly all in the future, and it will have a tremendous appeal, not only to the pioneer scientists, but to the radio hams

and the electronic gadgeteers.

I am referring to what we might call microwave astronomy, or radio astronomy. I've just been summarizing the principal contents of this new branch of astronomy which we add to the three other general fields of research—photometry, astrometry, and spectroscopy. There are, of course, the theoretical branches of astronomy like celestial mechanics, the theory of radiation and atomic transformations—but I'm talking about observational astronomy.

In this new field of microwave astronomy, or radio astronomy, we have such adventures as the exploration of the ionosphere and its various layers; the measurement by radio of the heights and numbers and motions of shooting stars in our Earth's atmosphere; the bouncing of radio waves off the Moon, which is not nearly as silly as it sounds, because this two-way connection with the Moon will help us explore our own upper atmosphere and especially explore the so-called empty space between the Earth and Moon; and finally there is solar noise, and cosmic static. And in addition to those five fields of this new branch of astronomy we must mention the measurement of cosmic radiation somewhere—the measurement of those highly penetrating cosmic rays, for which the origin is unknown.

Personally, I am hoping to make use of the radio noises from the region of the constellation Sagittarius in the Milky Way as a part of my exploration of what I call the Hub of the Universe, which lies more than 20,000 lightyears away, and sends us not only the light of the billions of stars in the nucleus but apparently broadcasts in the ten meter band.

Dr. Wendell M. Stanley

Dr. Wendell M. Stanley of the Rockefeller Institute for Medical Research, a Nobel prize winner in medicine and physiology, told the science-minded high school audience that:

I think that I can give you, and the host of young scientists who may be listening in, every assurance that you need have no worry about lack of scien-

HOBBIES BRING HONORS —

Barbara Wolff shows phenocopies in fruit flies; Andrew Kende, new solvents to reduce explosion hazards; Kurt Kohn, ant colony; Ursel Blumenheim, planarians; Stanley Zisk, radio transmitter; Walter Scheider, electronic photoflash; Lawrence Schaad, apparatus for growing organisms under glass; Gerald Howett, three dimensional graphs; Gene Baraff, home-built telescope; Laura Maurer, electrical formula test; David Geller, hard-water-effect on soaps, detergents; John Jamieson, apparatus for high frequency directive antenna measurement. Read left to right.

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tific worlds to conquer. Despite the large number of scientists now at work there is no lack of interesting and important problems. The very nature of science is such that the solving of an important problem usually only serves to uncover other new and important problems. Thus, although progress is being made, the scientific horizon is becoming broader and broader, and the need for well trained young scientists is becoming more intense.

Although diseases caused by viruses have been recognized for hundreds of years, the viruses themselves were recognized only about 50 years ago, and they seemed to have the properties of small living organisms. But most viruses proved to be so small that they couldn't be seen with even the best light microscopes and their true nature remained somewhat a mystery.

Tobacco Mosaic Virus

Now you might think when I obtained tobacco mosaic virus in the form of a crystalline nucleoprotein in 1935, that the mystery surrounding the nature of viruses would disappear. But this did not prove to be the case. Although a few other viruses were found to be crystalline nucleoproteins, still other viruses were found to consist of large particles having a morphology somewhat similar to that of living organisms. These viruses seem to consist of a series of structures of gradually increasing complexity and to provide a connecting link between the molecules of the chemist and the organisms of the biologist. They exist at the very twilight zone of life and as one learns more about them, many new problems arise.

One of these problems might be: How do viruses grow or reproduce? And we also have the problem of how they change or mutate to form new strains which cause different patterns of disease.

Because viruses represent the simplest structures we know having properties characteristic of living organisms, studies on viruses should help solve the many problems relating to the nature of life. You see, there are exciting and important problems that face us today. I can assure you that some of these or other new, equally exciting and important problems will be with us and ready for you, five, ten and even 50 years hence.

Dr. Karl Lark-Horovitz

Dr. Karl Lark-Horovitz, head of the department of physics of Purdue University in Indiana, said:

We must learn to understand the na-

ture of elementary particles, the forces with which they interact and the manner in which they can be arranged. Solve this general problem and we would understand the behavior of the atom with its electrons and nucleus and the cosmic radiation. The construction and operation of giant new high-voltage machines has resulted from our understanding of the way in which fast-moving particles act.

Research in Realm of Volts

We know already that production of new chemical elements and new reactions result from investigations in the realm of hundreds of millions of volts reached so far. One exciting result of recent research has been the large-scale production of materials which at will can be made into insulators or conductors of electricity. This is a discovery which promises much for the future of electronics.

The machine age in physics has just begun. We may confidently expect, within the next decade, to see high energy experiments in the laboratory in the billion-volt range. We shall thus produce systematically what are nowadays only sporadic events in nature. The fields of radiation chemistry and radio-biology have been barely tapped. To succeed fully in these new fields there must be cooperation between physicists, chemists, and biologists to study the way radiation and matter interact whether it is living or inorganic. Physical methods may change the whole aspect of chemical analysis within the next decade. When we get more insight into the basic nature of the way particles and radiation interact, we shall have to reformulate our philosophy. We've known since the days of Gilbert, over 300 years ago, that the earth is a giant magnet. But we

STS Winner Writes

"With the development of the remarkable silicones and other new commercial compounds, such as many of the synthetic sex hormones, the importance of Grignard reagents in industry has assumed new meaning.

"In my work with organic silicon polymers, the usefulness and disadvantages of Grignard reactions soon became apparent. The outstanding drawback of Grignard processes is the always present fire hazard due to the explosive vapors of the commonly used solvent, ethyl ether.

"The purpose of my project is the elimination, or at least reduction of the danger of working with this flammable, volatile liquid, without seriously inhibiting the vigor of the reaction. It is well known that higher alkyl ethers as well as aromatic ethers are less volatile and considerably less hazardous than ethyl ether. Specifically then, I was interested in establishing whether or not some or all of these different ether types could be used, instead of ethyl ether, to make a Grignard reagent.

"It has been shown that certain relatively non-volatile ethers can be used in Grignard reactions. . . . These are dibutyl ether, anisole, and diphenyl ether."—From the essay of Andrew S. Kende.

don't know why. That is a problem and a challenge for you. Living organisms have a tremendous sensitivity that makes our electronic instruments seem clumsy indeed. There will be many new things to do in the future particularly in the borderlands between physics and biology and physics, astronomy, and geology.

Science News Letter, March 13, 1948

GENERAL SCIENCE

From Many Walks of Life

By GWILYM A. PRICE

President, Westinghouse Electric Corp.
Member of the Board, Westinghouse Educational Foundation

Message delivered at the Awards Banquet of the Seventh Annual Science Talent Search, Washington, D. C.

➤ MY compliments to you, Mr. Davis, and to all the others who have made this Science Talent Institute the success it has been. And I extend the gratitude of our organization to all the guests who have taken their time from busy days to do

honor to our 40 Science Talent Search finalists for their high achievements.

To the 40 young men and women, my warmest congratulations.

As I looked over the biographical information about these young people, I was impressed by the varied paths that have led them to Washington. They come from 16 different states, and five of them were born in other lands. Many of them have parents who were born abroad. And their parents follow many walks of life—a missionary, a machinist, a high school principal, a sheet metal

STS Winner Writes

"Four or five days after the first larvae appeared, they were removed from the tube and placed in a Syracuse dish in one-eighth of an inch of cyanin solution at a distance of nine inches from a 100-watt, 120-volt desk lamp. The larvae were irradiated for periods varying from 20 to 30 minutes. They were then rinsed in Solution A to remove the excess dye. The irradiated larvae were then placed in fresh medium, a record being kept of the number placed in each tube. They were allowed to develop, and as the flies hatched, they were examined for variations.

*"I plan to continue this work, photographing and making slides of the variations. I shall attempt to produce phenocopies by varying the temperature during the critical period. I shall also attempt to improve my technique, to get the exact age at which the development of the larvae can be affected, and to determine the similarity of the somatic variations I have produced to mutations known to occur in *Drosophila*.*

*"Through my work with *Drosophila*, I am learning the technique and methods of experimentation in one branch of biology. I am learning that research work in science is hard and often discouraging, but a thrilling and rewarding experience."*—From the essay of Barbara Wolff.

worker, a doctor—to mention a few.

I doubt that there is any other nation in the world where a search of this kind would turn up youthful talent from so rich and varied a background. As an editorial writer for the *Newark Evening News* has said concerning this Search, "The American dream is many things and of it each writes his own definition, but its essence is the recognition that ability has nothing to do with racial origin or economic circumstances, and that opportunity for self-development is available to all."

Tonight's banquet is the final wind-up of five very busy and full days for this group of young people. But, like all graduations, it is really a commencement. Because they have been singled out from the 16,000 boys and girls who started toward this goal, from now on they are in the spotlight.

Their country will be watching their progress. For we all know that when everything is right with our young people, there is a good chance that everything else will work out all right.

I once heard a story that illustrates what I mean. A young father, finding his son with nothing to do, tore a map of the world out of a magazine, cut it up, and gave it to the boy to piece together again. A few minutes later the job was finished, and he asked his son how in the world he ever did it so fast. "Well,

Daddy," said the lad, "on the back of the map was a picture of a boy. I knew that if I could build the boy right, the world would come out right, too."

In young people of the caliber of our STS winners lie the hopes of our country and the world in years to come.

Science News Letter, March 13, 1948

GENERAL SCIENCE

Employment in Science

➤ CHOOSE your field on the basis of your own abilities, rather than upon the considerations of economic outlook, is the advice of Ewan Clague, commissioner of Labor Statistics at the U. S. Department of Labor, to future young scientists.

Speaking before the Educational Conference of the Seventh Annual Science Talent Search, Dr. Clague said that although there is now a shortage of trained workers in leading scientific and technical professions, this condition should improve within a few years. "We are now training more young people in the colleges for the scientific professions than ever before," he declared.

Recent estimates made by the President's Commission on Higher Education indicated that on the basis of past trends college enrollments would rise to 2,900,000 by 1960, or more than one-fourth above the 1947 peak, he pointed out.

This means that competition will be keen and subject to rapid change, he predicted, as science opens new fields, as industrial use of research advances,

or as the international situation changes.

In attempting to answer what these trends imply for the individual student interested in the sciences, he presented the analyses made by the Occupational Outlook Service of his department and gave this further advice:

"Each young person planning to go into the sciences must prepare to undertake a rigorous and thorough course of training and preferably to complete graduate study. The long term trend toward requiring more advanced education for scientific professions, as well as the competition foreseen in the next few years, recommends this.

"At the same time it will be desirable for each student to maintain the maximum degree of occupational flexibility, so that he can adapt to changing circumstances. This means getting the broadest basic scientific education as well as specializing in a particular field. It means also being prepared to make adjustments and keeping an open mind on the subject of one's occupational specialization."

Science News Letter, March 13, 1948

GENERAL SCIENCE

Spot Science Talent Early

➤ YOUTHFUL scientists should be made to feel that they are as important as athletes, Dr. Arthur S. Adams, provost of Cornell University, declared at the Educational Conference of the Seventh Annual Science Talent Search, meeting in conjunction with the Science Talent Institute held for the 40 winning high school scientists in the Search.

Dr. Adams told educators at the conference that the first job in solving the national problem of providing adequate scientific personnel was to spot science talent early.

He praised the Science Talent Search as "a fundamental effort to achieve such identification and to give important recognition to those who have given convincing evidence of their promise in

scientific work."

Once science talent is discovered, it must be encouraged, Dr. Adams pointed out, adding that money is not the only requirement.

"The individual who is blessed with superior scientific aptitude should be made to feel that his talent is as important to society as is, for instance, the talent of an athlete," the educator asserted.

He warned against making the young scientist "a sort of intellectual curiosity."

Development of the relationship between professional work of the scientist and its social significance was urged, and Dr. Adams emphasized that the young scientist must learn to work effectively with other scientists.

Science News Letter, March 13, 1948

MEDICINE

Test for "Silent" Cancer By Vitamin A in Blood

➤ A NEW test for detecting "silent" cancers in time for successful treatment may come from studies at the Warwick Memorial Clinic of Washington, D. C.

Cancer of the stomach, which rarely shows symptoms in the early stages, is one kind that the new test might pick up. The test would be made by measuring the amount of vitamin A in the blood. If this is less than normal, the person would be given vitamin A either by special diet or capsules or both.

If he responded to this treatment and the amount of vitamin A in his blood came up to normal, it probably would mean he had been having a vitamin A deficiency due to poor diet. But if his blood did not show an increase in vitamin A content after treatment with the vitamin, it would mean he had cancer.

The test "looks good on paper but it may turn out to be a dud," Dr. Calvin T. Klopp, medical director of the clinic, warned.

Basis for the test is the finding some years ago by the late Dr. J. Abels of Memorial Hospital, New York, that 87% of patients with certain kinds of cancer, including stomach cancer, had blood low in vitamin A. In persons without cancer, 11% were found to have this low vitamin A level in the blood. Treatment with vitamin A did not bring the amount in the cancer patients' blood to normal, but did bring the vitamin level to normal in the non-cancer group. Dr. Abels' study was aimed at learning what was wrong in the body chemistry of patients with cancer. Dr. Klopp is using his finding from the opposite approach of trying to detect "silent" cancer in apparently healthy people.

The vitamin A study is one of 10 projects the Warwick Memorial Clinic will undertake with aid from the American Cancer Society. A grant of \$50,000 to the clinic was just announced by Douglass Poteat, ACS executive vice president. The clinic is about to become affiliated with George Washington University School of Medicine.

Science News Letter, March 13, 1948

BACTERIOLOGY

Bacteria Are Paralyzed By Penicillin Attack

➤ PICTURES of what happens to bacteria attacked by penicillin have been obtained by two French bacteriologists,

Drs. R. Tulasne and R. Vendrely, of the University of Strasbourg. They present their results in the British science journal, *Nature* (Feb. 28).

Drs. Tulasne and Vendrely first developed a chemical method for making visible the nuclei of bacteria, the very existence of which was regarded as doubtful a few years ago. Sometimes two or four nuclei appear in cells when growth and multiplication are rapidly taking place.

Using this technique on bacteria grown on food substances to which penicillin had been added, they found that the bacterial cells swelled up a great deal, and that the nuclear material appeared in several distinct masses, but that the cells did not divide. The bacteriostatic effect of penicillin therefore seems to be a paralysis of the cell's general protoplasm, rather than a stoppage of nuclear division.

Science News Letter, March 13, 1948

CHEMISTRY

Vitamin A Originates in Young Plants, Vegetables

➤ YOUNG plants and vegetables are the original source of vitamin A. This finding, which upsets previous scientific teaching on the subject, was made by Prof. Edith A. Roberts and Miss Mildred D. Southwick of the Vassar College department of plant science, Poughkeepsie, N. Y.

The electron microscope, modern scientific tool for studying things so small they cannot be seen even with high powered light microscopes, was used in the discovery.

Heretofore, the livers of fish were considered the main source of vitamin A. Plants were believed to furnish only a chemical parent of the vitamin, called carotene. The vitamin itself was believed formed in the liver from plant foods.

This belief is disproved by the Vassar scientists' discovery. Vitamin A, they showed, is first formed in the plant and there built into carotene and stored as such. So vitamin A is really the chemical parent of carotene, instead of carotene being the vitamin's parent chemical. Carotene can, however, be converted to vitamin A.

From the standpoint of human nourishment, this means that young green and yellow plants, which contain quantities of the vitamin itself, are the practical source of it.

Science News Letter, March 13, 1948



CHEMISTRY

New B-Group Vitamin Reported Discovered

➤ DISCOVERY of a new vitamin, believed to be a member of the vitamin B group, was announced by Prof. S. M. Hauge of Purdue University at a conference on feeds of the beverage distilleries in Cincinnati.

Existence of the vitamin was first suspected in studies on chicks. Later work leading to positive knowledge of its existence was done with rats. It is a growth factor for rats, chicks and a micro-organism, *Lactobacillus arabinosus*, but what human use it may have was not reported by Prof. Hauge. The vitamin was discovered in an animal food called distillers dried solubles which is derived from distillery wastes. This material and also condensed fish solubles may contain still other growth factors, or vitamins, Prof. Hauge said.

Science News Letter, March 13, 1948

RADIOLOGY

New Germ-Killing Lamp Doubles Previous Potency

➤ A RADICAL change in design features a new germ-killing ultraviolet lamp which is twice as effective in destroying bacteria and viruses in the air as previous types. It is a 36-inch-long tube which emits twice the usual amount of ultraviolet radiation.

The new lamp, developed in Bloomfield, N. J., by Westinghouse, not only produces more ultraviolet radiation for each watt of electricity consumed but it also provides an almost uniform level of radiation throughout its life. These radiations are generated by passing an electric current through the three-foot tube containing mercury vapor and other gases.

The glass used in the tube is a type with a remarkable resistance to what scientists call solarization. This is an invisible "suntanning" in glass which reduces the amount of bacteria-killing radiation. The rated life of the new lamp is 6,000 hours, or almost a year of normal usage. The previous average rated life of similar lamps has been 4,000 hours.

Science News Letter, March 13, 1948

E FIELDS

MEDICINE

Allergy Remedy Suggested As Viper Venom Antidote

➤ USE of one of the modern allergy remedies, benadryl, as an antidote for viper venom poisoning was suggested by Drs. J. S. Chowhan and D. P. Ghosh of Calcutta at the Indian Science Congress held in Patna, India.

Viper venom, they point out, acts mainly on the blood circulation system and the collapse that follows is like that caused by histamine. The anti-histamine action of benadryl led the Indian scientists to test it as an anti-venom drug in laboratory animals poisoned by Russell's viper venom. The animals were in collapse. But small doses of benadryl injected into their veins restored their blood pressure to normal and relieved the breathing distress they suffered.

Benadryl was effective in the animals whether injected mixed with viper venom or immediately after a big dose of the venom. The Calcutta scientists suggest using it by mouth or by injection into muscles or veins of human viper venom victims.

Science News Letter, March 13, 1948

IMMUNOLOGY

New Vaccines for Plague, Cholera Prepared in India

➤ NEW and more powerful vaccines against plague and cholera have been developed at the Haffkine Institute of Bombay, India. Preparation of the cholera vaccine in a casein medium (casein hydrolysate) was shown by Major-General Sir Sahib Singh Sokhey, director of the Institute, to a group of foreign scientists who had attended the Indian Science Congress at Patna.

A biological method for measuring the protective action of the cholera vaccine has been worked out and shows it to be 100 to 1000 times more powerful than the vaccine in use before.

The cause of the recurring plague epidemics in Bombay province has been traced to certain endemic areas with special conditions of temperature and humidity. From these areas infection is carried to adjoining areas when climatic conditions permit epidemics to occur.

By preparation of vitamins and vari-

ous chemical remedies such as sulfa drugs in substantial quantities and sale of some of them to hospitals and government institutions, the Haffkine Institute has become self-supporting.

The manufacture of a polyvalent anti-snake venom serum against the venom of the four common poisonous snakes of India, the cobra, Russell's viper, the saw-scaled viper and the common krait, is also carried out at the Institute. The drawing out of the venom from the fangs of the snakes is one of the more spectacular activities of the Institute staff.

Science News Letter, March 13, 1948

GENERAL SCIENCE

Form New Society for Scientists in Industry

➤ A NEW scientific organization designed for scientists in industry and technical schools has been organized in New Haven, Conn., under the sponsorship of Sigma Xi, a national honorary scientific organization in American universities.

The new group, called the Scientific Research Society of America, is planned to fill a gap in scientific organizations, and extend the benefits of the university society to scientists in research laboratories outside institutions of higher learning. The Scientific Research Society of America will be modeled on Sigma Xi, and its activities will include local group functions, national lectureships, publications and grants-in-aid.

Science News Letter, March 13, 1948

GENERAL SCIENCE

French Atomic Scientist Named to UNESCO Position

➤ PROF. Pierre Auger, French atomic energy expert after whom cosmic ray bursts are called Auger showers, is the new head of UNESCO's natural sciences section, succeeding Dr. Joseph Needham, British biologist who is returning to his professorship at Cambridge University.

Dr. Clarence E. Beeby, New Zealand director of education will coordinate UNESCO's educational activities as assistant director-general while Prof. Pedro Bosch Gimpera, archaeologist, formerly dean of philosophy at University of Barcelona, and recently professor at the University of Mexico, is the new director of UNESCO's section of philosophy and humanistic studies.

Science News Letter, March 13, 1948

TECHNOLOGY

Diamond Tool Cuts Curves Into Spectacle Lenses

➤ A NEW diamond tool to cut highly accurate curves into spectacle lenses used in correcting poor eyesight decreases by half the time required in lens grinding.

This new optical machine is a development of the American Optical Company, of Southbridge, Mass. and functions automatically after a few adjustments. It generates both spherical and cylindrical curves on the lens surface in one cutting operation. The lens is then ready for final finishing operations.

In describing the operation of the machine, W. A. Bonin of the company said the lens is first imbedded in pitch covering a curved metal block attached to a spindle. A magnetic chuck on the machine locks the spindle in the correct position for the diamond-impregnated tool to cut the prescribed curves in the lens. The head of the machine holds the diamond tool and is rotated in an arc.

Science News Letter, March 13, 1948

ENGINEERING

Need No Wire Connections In Interlocking Battery

➤ TINY cells that interlock to form a miniature dry cell battery, eliminating the need for wire connections and the necessary soldering, were revealed by W. S. Allen, Electrical Division of Olin Industries, New Haven, Conn. When the cells are stacked together they interlock automatically.

The new interlocking cell, to be known as the Olin cell, was described by Mr. Allen as one of the principal advances in the manufacture of the modern dry cell battery. The tiny cells are made of plastics and are rectangular in shape. When stacked, they make a battery which occupies much less space than those of the usual cylindrical shape.

Each individual battery cell, regardless of size or shape, produces approximately one and one-half volts of electricity. Because of this, it has been possible to reduce the size of some of the new cells to almost wafer-thin dimensions without reducing voltage. They range in size from about half the area of a postage stamp to about one and one-half inches square, and from three-sixteenths to three-eighths of an inch thick. These batteries are designed primarily for use in hearing aids and small radios.

Science News Letter, March 13, 1948

NUCLEAR PHYSICS

Atomic Radiation Fighters

Need for an offensive attack against the destructive power of the atom has led to the creation of the first atomic medical school at Rochester University.

By JANE STAFFORD

➤ AMERICA'S major medical offensive against exploding atoms that spread death and destruction will get under way in a few months through the creation in Rochester, N. Y., of a new kind of medical school.

There is urgent need for a new kind of doctor, "radiation fighters," to counter one of the most dangerous aspects of atomic bombs, atomic power plants and other man-made radioactivity.

We need a new first-line of defense against atomic radiation injury in peace or war.

If there ever is an atomic war, our Army and Navy will need medical officers trained to treat atomic casualties.

And peace in the atomic age will bring its new and special toll of accidental atomic casualties unless there are plenty of specialists to plan protection against such accidents.

Civilian "West Point"

The first atomic medical school, a part of the University of Rochester and supported by the Atomic Energy Commission, will be a sort of civilian "West Point" for our defenders against the consequences of atomic energy.

Long before the atom bomb, radiation took its toll. A tragic peacetime by-product of World War I was the poisoning of girls who painted the radium watch dials which became generally popular after discovery of their military usefulness.

The general public at that time knew very little about radium, its power and its danger. Only a handful of people, doctors and other scientists who rarely entered a factory, would have known that it was dangerous to use lips and tongue to point brushes dipped in radium paint.

Today the whole world knows atomic radiation is dangerous. But there are still very few persons who can tell girls in a factory how to handle atomic chemicals safely. Nor would the workers themselves know, any more than the watch dial painters of a generation ago, whether there was danger in a

new work method they themselves thought up for greater speed or efficiency.

We need experts to protect us from peacetime developments in atomic energy all along the line, from the miners who dig uranium-bearing ore out of the ground to men and women in factories putting atomic chemicals to new uses and including sick people being treated with them and people living in the neighborhood of our future atomic power plants.

Effects of Atomic Radiation

Authorities do not believe that radiation used as a weapon will destroy the fertile greenness of the earth or that the human race will be wiped out in three generations by the effects of atomic radiation on reproductive cells. But they do believe, in fact they know, that much more information is needed on the effects of radiation on all forms of life.

Training scientists who can get this kind of information for us will be one of the jobs of the new atomic medical school.

To get this new information, they need first to study what is known now of the effects of radiation, how it burns and destroys when it hits the body from outside, and what it does to the blood-forming system, the heredity-carrying genes and other body cells when it gets into the body.

Courses in the new science of health physics will be taught. Knowledge of physics and electronics is needed for making safety measurements that guard against dangerous radiation.

How gases, dusts and aerosols spread must also be studied, since these may carry radioactivity in the air.

Chemistry, toxicology and legal medicine will be other subjects taught in the new atomic medical school.

Medical courses will include both treatment of radiation injury and methods of using the new radioactive chemicals to treat other kinds of diseases, such as cancer.

At Rochester they tell the story of a four-year-old boy brought to the hospital with a cancer of the thyroid gland. Surgeons removed this but the cancer had

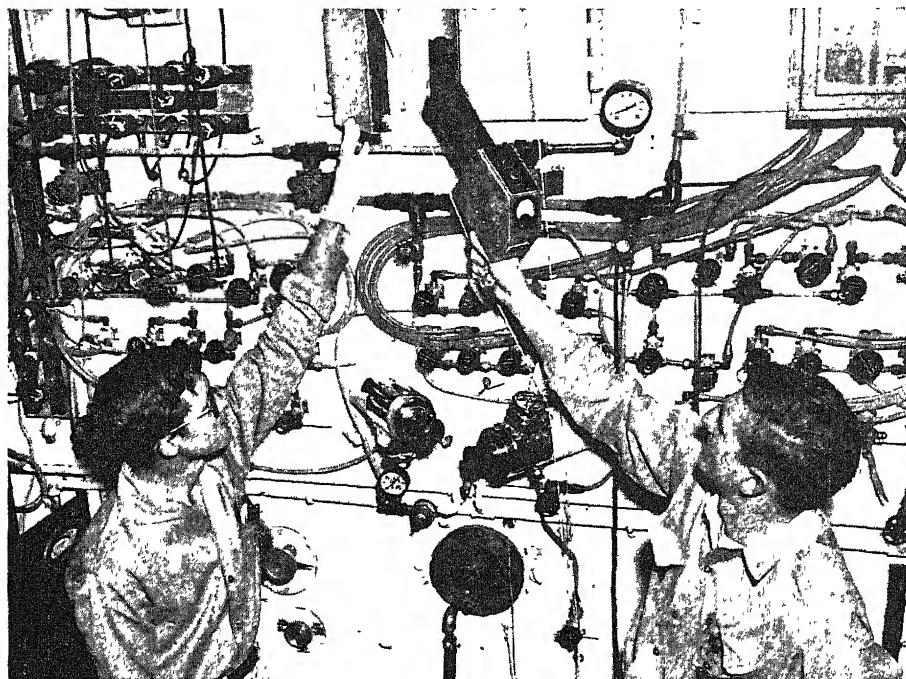
spread back into his throat and the boy had to have a tube put into an opening cut through his neck from outside so he could breathe. He was given a tracer dose of radioactive iodine and this showed that, fortunately, the cancer was the rare kind that picks up and concentrates iodine. The University of Rochester at that time had only a small cyclotron, so their supply of radioactive iodine was very small indeed. But one of the scientists was just then going to a scientific meeting in St. Louis. He got one of the scientists in that city to run his big cyclotron for the four days of the meeting and brought back with him enough radioactive iodine to save the child. Today, two years later, he is alive and well.

These thyroid gland cancers that can be cured by radioactive iodine are very rare. But scientists hope to find other radioactive chemicals that can destroy commoner varieties of cancer without damaging the rest of the body. Preparation to search for such chemicals and for the best way of using them will be included in some of the courses at the new atomic medical school.

Protection of Public Health

Public health departments may be sending men and women to this school for training. Suppose a truck or train or plane carrying radioactive material is wrecked and the contents spilled on the roadside, right of way or, in case of a plane accident, into a community water supply. Protecting people from a water supply contaminated with radioactivity is probably just as much a function of health departments as protecting them from water supplies contaminated with typhoid fever germs. But the methods of testing for contamination and protecting against it are entirely different.

The school will take about 100 students at a time. About 30 of them will be taking short courses in health physics and protection techniques, including dust counts and other radiation measurements and blood chemistry. Another 30 will be college or university graduates studying for Ph.D. degrees. These will spend at least three years at the school. The remaining 40 will be doctors, either M.D.'s or Ph.D.'s or West Point graduates. Army and Navy doctors in this group will probably take a one-year course, civilian doctors a two-year course.



GUARD AGAINST RADIATION DANGER—Laboratory workers are shown inserting a gun-shaped detector into a thick-walled concrete cell where the most dangerous of the radioactive materials are kept at Oak Ridge.

Taking part in national defense against radiation danger is not an entirely new thing to the University of Rochester. The Manhattan District borrowed its professor of radiology, Dr. Stafford Warren, now at the medical school of the University of California at Los Angeles, to head its health protection and medical activities. And in 1943 the Manhattan District set up a medical research unit across the road from the University of Rochester's School of Medicine and Dentistry. The unit subsequently became the first and, so far, the only project of its kind operated by the Atomic Energy Commission. Its present director is Dr. H. A. Blair.

Discovery of a potential medical weapon against radiation damage, from the atom bomb or from non-military sources, has just been announced by

two of this atomic energy project's staff. They are Drs. Paul E. Rekers and John B. Field. Their discovery is that rutin, obtained as a bright yellow powder from the green buckwheat plant among other sources, might save radiation victims by strengthening the walls of their blood vessels. This chemical, they reported, has protected dogs from the uncontrollable and fatal bleeding which is a primary factor in the deaths of humans and other mammals exposed to sublethal and midlethal doses of total body radiation.

But Dr. Rekers and associates are not stopping with this discovery. It came as part of a study of hemorrhage and the effects of radiation on the blood and blood-forming system. That study is continuing and promises further important new knowledge.

Science News Letter, March 13, 1948

NUCLEAR PHYSICS

Atomic Power in Industry

➤ **ATOMIC** energy will have many industrial applications, but it will certainly not be immediate, the American Society of Mechanical Engineers, meeting in New Orleans, was told by Dr. Lyle B. Borst, chairman of the Nuclear Reactor Project, Brookhaven National Laboratory, Upton, N. Y.

It will be 10 to 20 years before atomic energy can compete favorably with coal as a source of industrial power, he said. Many problems are to be solved first, but the development of atomic power is one of the most direct and foreseeable future industries. The earliest applications will probably be for mobile use, as for ships,

submarines and airplanes. Atomic powered automobiles are not deemed feasible.

The generation of power from the atom for peacetime use will be demonstrated at Brookhaven within the next two years, it is expected, he said. Since the nuclear reactor, of which he has charge of design, construction, and operation, is planned for research rather than for a power plant, the power generated will be a by-product. The nuclear pile will power a steam plant which will generate electricity to be used in driving cooling fans and other apparatus.

Among current problems is that of operating reactors at sufficiently high heat for the conventional engine. Dr. Borst declared that scientists have looked long and hard, but unsuccessfully, for a trick method of getting electrical energy directly from the chain reaction. We acknowledge generally, he said, that electrical power, for the foreseeable future, will be generated by means of the general heat engine.

Another problem is concerned with the economy of the fissionable material employed in getting atomic energy. In the utilization of uranium, only one atom in every 140 is the isotope U235 which undergoes thermal neutron fission, he stated. The other 139 are all U238 which absorbs neutrons to make plutonium.

Principal reactors throughout the country are based on the fission of U235. Thorium is not used at all. High-grade uranium is scarce. For a large-scale power industry, we must learn to use U238 as well as thorium. Then we will have enough raw material to generate power for centuries.

Science News Letter, March 13, 1948

ASTRONOMY-RADIO

Decline in Sudden Storms Seen in Next Few Years

➤ **FEWER** sudden storms in the ionosphere that for a few hours completely knock out all communications and also fewer violent storms that black out all paths for many hours may be expected during the next six or seven years. But the band of usable radio frequencies for world-wide communication will become ever narrower during this period and from this trouble may arise. These trends are foreseen because the peak of sunspot activity, associated with shortwave radio disturbances, was reached last summer.

As activity on the sun decreases, the ionosphere also becomes less densely ionized so that it will not reflect the higher radio frequencies back to the earth, the

Do You Know?

A hen takes some 80 pounds of *feed* a year whether she lays or not.

A radio-equipped *helicopter* was recently used to direct highway traffic.

Paper pulp, supplemented with molasses and soybean protein, is a good *cattle feed*.

Decks of American vessels of the future will be made of resin-treated compressed American woods instead of Far-East teakwood.

The moth that is seen flying around the house does not eat clothing itself; it is the tiny caterpillar-like larva that does the damage before it changes into the winged adult.

A "sustained yield" *forest* unit is one in which permanency is maintained by the cutting of only the fully-grown ripe trees and the adding of replacements if necessary.

National Bureau of Standards states.

The first effects of sunspot decline will probably be felt on the 50-megacycle amateur band. Within a few months communication on this frequency will no longer be dependable for distances much greater than 75 miles.

The overall effect will be to jam all radio communication into an ever narrowing band of frequencies for worldwide communication. From a usable frequency band whose upper limit is now around 50 megacycles, it will narrow down, at sunspot maximum, to an upper limit of approximately 20 megacycles for continent to continent transmission.

This narrower band makes it possible for relatively slight disturbances to be more disastrous than at sunspot maximum when the usable range of frequencies is larger. At sunspot minimum, a minor storm in the ionosphere may effectively crowd out all usable frequencies. At maximum, it takes a violent storm to completely disrupt communications.

During the last year or so there have been both more spots on the sun and some of the largest sunspot groups of all time. The three largest groups ever photographed appeared in February and July, 1946, and in March-April, 1947.

Science News Letter, March 13, 1948

NUCLEAR PHYSICS

Atomic Particle Created

Major step in the exploration of matter is the first artificially created meson or mesotron. Consider it key to mystery of atomic heart.

➤ THE elusive atomic particle, called both meson and mesotron, has been created artificially for the first time in the largest of the University of California cyclotrons. (See *SNL*, Jan. 10, Feb. 14.)

Hearts of helium atoms (alpha particles), accelerated to energies of 400,000 electron-volts, were used to give rise to mesons. Cosmic rays of similar energy create them naturally in the upper reaches of the atmosphere. It is understood that word of the achievement was passed out to some of the investigators of the atomic nucleus in this country. It is recognized as a major step in the exploration of matter.

The meson is considered the key that may unlock the mystery of the forces that hold the atomic heart together, just as the neutron discovered in 1932 was the key to atomic energy release in the first chain-reacting pile a decade later, and the atomic bomb in 1945.

There are theoretical grounds for hoping that the meson can blast energy out of heavy elements even more effectively than the neutron. The future may bring a meson atomic bomb, now that the scientists can create mesons under control.

Actually there are probably four or more varieties of particles called mesons. The most usual one found in cosmic ray bursts is about 200 times the weight of the electron. All of the kinds of mesons are intermediate between the electron, lightest subatomic particle, and the proton, heart of the hydrogen atom. The proton and the neutron are each about 2,000 times the weight of the electron.

Now that mesons can be made in the Berkeley giant "atom smasher" much more should be learned about them. Although mesons live only a fleeting fraction of a second, they can be studied and used as experimental tools once they are created at will.

Theoretical physicists suspect that mesons are a sort of go-between in allowing neutron and proton to turn into one another. They have evidence for this strange performance but do not yet understand what happens. The closest picturization would be the meson being

passed back and forth like a ball between two basketball players.

Within the year four other accelerators—those building at Columbia, Rochester, Cornell and Harvard Universities—should be able to create mesons artificially. When these new machines come into use there should be greatly accelerated inquiry into the nature of the forces within the atomic nucleus.

It may be discovered that the proton and the neutron, both considered in the past as ultimate particles, may themselves be able to give rise to other, as yet unidentified, particles.

Science News Letter, March 13, 1948

MEDICINE

Ephedrine Found To Have Pain-Killing Effects

➤ FOR your next operation you may get as anesthetic the modern version of an old Chinese drug, *ma haung*. Ephedrine is the name of the modern drug extracted from the same Chinese plant. It is related chemically and in its effect on the body to adrenalin and has been used for many patients with allergies, low blood pressure or other conditions in which adrenalin is also sometimes used.

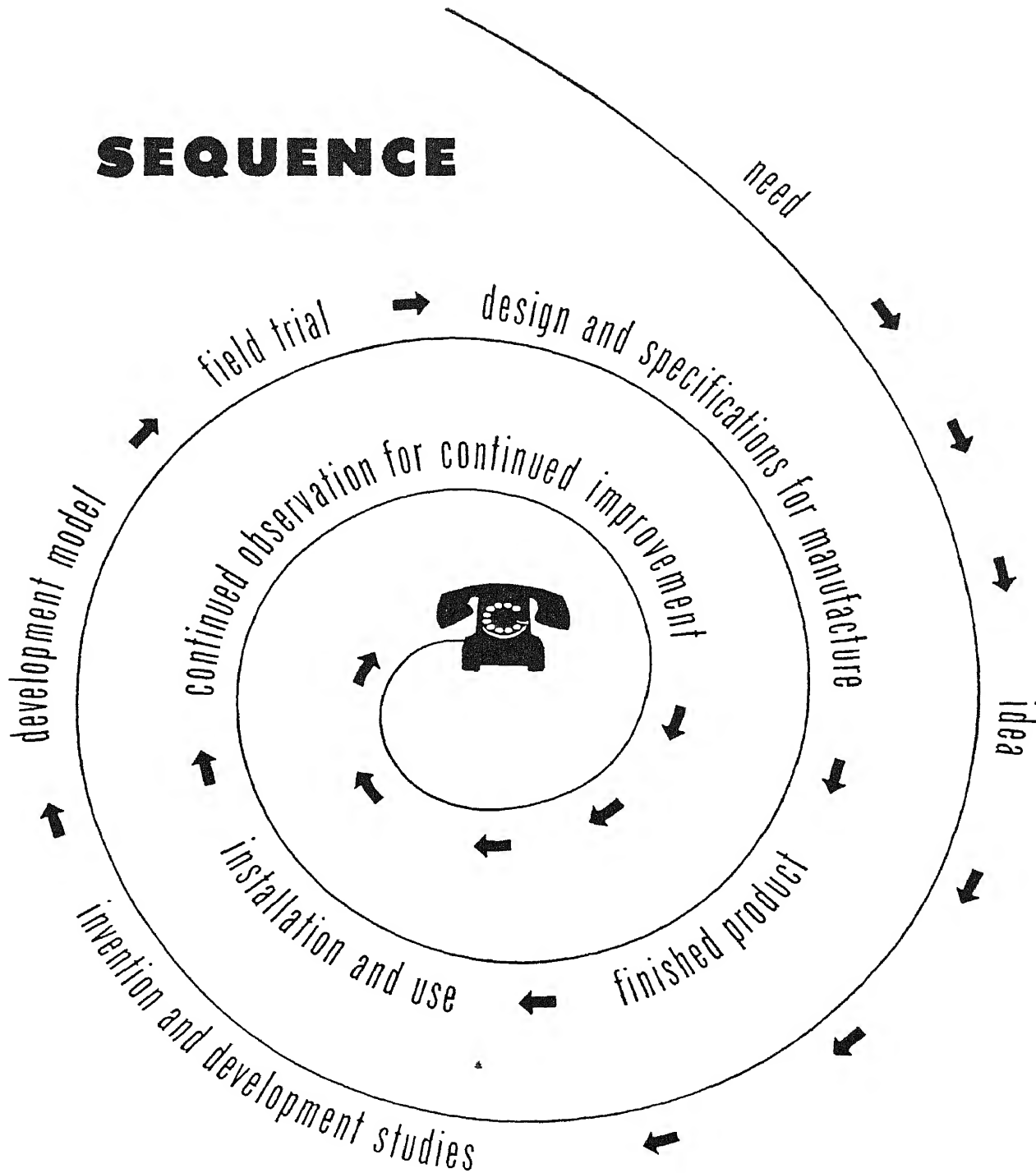
The anesthetic and pain-killing effects of ephedrine are reported by Drs. J. Eugene Ruben, Patricia-Mary Kamsler, and W. Lyall Howell, Jr., of Philadelphia General Hospital in the journal, *Science*, (Feb. 27).

A 43-year-old woman with diabetic infection of the foot had two toes amputated and extensive cutting and drainage of the foot under the anesthesia produced by a dose of ephedrine injected into her spinal canal. The drug did not put her completely to sleep, and she felt the operation but had no pain.

The use of ephedrine to prolong the effects of other spinal anesthetic drugs is now rather common practice, the Philadelphia group points out. But except for one scientist who found that ephedrine was a spinal anesthetic in frogs, no one has investigated the drug's anesthetic effect when used alone.

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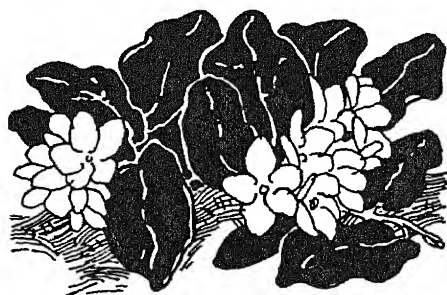
SEQUENCE



At Bell Telephone Laboratories, more than 2300 scientists, engineers, and their associates are continually exploring and inventing, devising and perfecting for improvements and economies in telephone service.



BELL TELEPHONE LABORATORIES



What Is Arbutus?

➤ ST. PATRICK'S DAY programs almost invariably include (and properly so) that beautiful Irish song, "My Love's an Arbutus." But listeners in the eastern United States and Canada, familiar only with the lovely early wildflower known as the trailing arbutus, are often a bit puzzled over the last verse, wherein the poet likens his fidelity to the evergreen leaf of the "arbutus tree." Lovely and fragrant though the trailing arbutus is, it certainly never even faintly resembles a tree.

The difficulty arises from the fact that the arbutus of Ireland (which incidentally is a member of the original and true genus *Arbutus*) actually is a tree, while our trailing arbutus belongs to a different, though related, genus, *Epigaea*. Its full botanical name, *E. repens*, exactly describes its quite un-treelike growth habit. *Epigaea* comes from two Greek words meaning "upon the earth", while *repens* is Latin for "creeping".

When our Gaelic bard sings:

"But tho' ruddy the berry and snowy the flow'r

That brighten together the arbutus bow'r,"

he shows that he knows his tree well, for the arbutus of Ireland normally continues to produce white flowers while its red fruits ripen. These red fruits have given rise to an alternative name, "strawberry tree".

Curiously enough, while the one foreign sister-species of our Eastern trailing arbutus grows in Japan, the only other species closely related to the tree

arbutus of Ireland (incidentally also of southern Europe) occur in our own West. The large shrub or small tree known in California by the Spanish name *madrona* belongs to the genus *Arbutus*. There is also an *A. arizonica*, a very handsome plant, that seems to have no generally accepted common name.

Science News Letter, March 13, 1948

ENGINEERING

Detects Invisible Vapors

Device, which functions as leak detector, looks like a "Buck Rogers" pistol. It is sensitive to some vapors and air-borne particles, including odorless gases.

➤ A LABORATORY device, described as having a sense of smell but which does not really function in the same manner as the human nose, detects certain classes of invisible vapors and air-borne particles including some which have no odors.

The instrument was described to the Institute of Radio Engineers by William C. White of General Electric, and also described by J. S. Hickey of Schenectady on the General Electric WGY Science Forum, held in New York,

The basic phenomenon used in this detector is the positive ion emission from a hot platinum surface operating in air. Electrons are the basic particles of electricity. Positive ions are atoms which have lost one or more electrons, they explained.

Emission of Positive Ions

The emission of positive ions from a surface can be greatly increased by certain vapors present in the air striking the electrode surface, it has been discovered recently. The chief requirement for these vapors is that they contain one of the halogens, fluorine, chlorine, bromine or iodine. The percentage increase in current is enormously greater than the percentage of halogen in the air.

We have taken this knowledge, both scientists said, and made a sensitive element comprising a red hot center electrode surrounded by cylindrical outer element. Since this device used positive ions instead of electrons, the inner hot electrode must be made positive in respect to the outer and is the anode of the tube. The entire electrode structure is made of platinum, which is one of the materials that can run red hot in the air without oxidizing.

To use this sensitive element as a leak detector, it is mounted in a casing. A small blower moves an air sample through a sampling tube and from there through the sensitive element. A pistol grip is added for convenient holding. The whole assembly looks like a "Buck Rogers" pistol.

The pistol, or detector, is connected by a cable to a control box which takes current from a 115-volt alternating current circuit, and supplies the sensitive element with low voltage for the heater and blower motor and direct current for the cathode. In addition it contains a simple amplifier to increase the signal from the sensitive element, and to give an audible response.

If a vessel suspected of having a leak is put under pressure with a gas containing a halogen there will be a concentration of the leaking gas near any leak that might exist. When the sampling tube is passed along the suspected surface, the presence of the escaping gas is evidenced by a change in tone of the signal from a loudspeaker.

Science News Letter, March 13, 1948

Science Service Radio

➤ LISTEN in to a discussion on spring floods on "Adventures in Science" over Columbia Broadcasting System at 3:15 p.m. EST, Saturday, March 20. Mr. Lyle Watts, Chief of U. S. Forest Service, will be guest of Watson Davis, director of Science Service. Mr. Watts will tell the story behind the floods and the dreadful toll they take in property and human lives.

Science News Letter, March 13, 1948

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THE BIRDS OF NANTUCKET—Ludlow Griscom and Edith V. Folger—*Harvard University Press*, 156 p., illus., \$3.25. Including what is not known as well as what is known about the birds of that Massachusetts island.

THE EARLIEST RECORDS OF CHRISTIANITY—E. L. Sukenik—*American Journal of Archaeology*, 30 p., illus., paper, \$1.00 or 80 cents each in lots of 20 or more.

ELECTRONIC CIRCUITS AND TUBES—Electronics Training Staff of the Cruft Laboratory—*McGraw-Hill*, 948 p., illus., \$7.50. Developed from lecture notes in the special wartime training course in the Graduate School of Engineering, Harvard.

THE FLIES THAT CAUSE MYIASIS IN MAN—Maurice T. James—*Govt. Printing Office*, 175 p., illus., paper, 35 cents. Brings together previously scattered information about this important group of insect pests.

FLUID MECHANICS OF TURBOMACHINERY—George F. Wislicenus—*McGraw-Hill*, 613 p., \$7.50. For advanced students and engineers.

FM TRANSMISSION AND RECEPTION—John F. Rider and Seymour D. Uslan—*John F. Rider*, 409 p., illus., paper \$1.80, cloth \$2.70. A book for workers in the field.

HEALING HERBS OF THE UPPER RIO GRANDE—L. S. M. Curtin—*San Vicente Foundation*, 281 p., illus., \$7.50. A study of the folklore of plant medicine in New Mexico. From the Laboratory of Anthropology.

MAN, WEATHER, SUN—William F. Petersen—*Thomas*, 462 p., illus., \$10.00. A statistical study with some unorthodox conclusions.

THE MARSHALL PLAN—Sidney S. Alexander—*National Planning Association*, 68 p., paper, 50 cents. Background on a vital topic prepared by a former consultant of the State Department.

MATHEMATICAL TABLE MAKERS: Portraits, Paintings, Busts, Monuments, Bio-Bibliographical Notes—Raymond Clare Archibald—*Scripta Mathematica*, 82 p., illus., \$2.00. Interesting reference material.

ORGANIC FORM AND RELATED BIOLOGICAL PROBLEMS—S. J. Holmes—*Univ. of California Press*, 169 p., \$5.00. An attempt to provide a better understanding of the normal growth and repair of living organisms as well as the abnormal cell development in cancer.

POSTWAR GERMANS: An Anthropologist's Account—David Rodnick—*Yale University Press*, 233 p., \$3.75. An account of home and community life in a country so devastated that it will take 25 years to clear away the rubble, as seen through the eyes of a scientist.

RADAR BEACONS—Arthur Roberts, Ed.—*McGraw-Hill*, 489 p., illus., \$6.00. A text and reference book in a new field from the Radiation Laboratory of MIT.

SYMPOSIUM ON PAINT AND PAINT MATERIALS (1947)—*American Society for Testing Materials*, 115 p., illus., paper, \$2.00, cloth \$2.65. Technical papers.

TOPICS IN PHYSICAL CHEMISTRY. A Supplementary Text for Students of Medicine—W. Mansfield Clark—*Williams & Wilkins*, 738 p., illus., \$10.00. Useful not only as a text but as a reference book for technologists in the clinical laboratory.

TURKISH ARCHERY AND THE COMPOSITE BOW—Paul E. Klopsteg—*Klopsteg*, 2d ed., 187 p., illus., \$4.50. Of interest to both scientists and sportsmen is this analysis of Turkish archery in the light of modern scientific studies.

Science News Letter, March 13, 1948

GENERAL SCIENCE

UNESCO Plans Exchange Of Medical Literature

➤ URGENTLY-needed medical literature from the duplicates in American medical libraries will be distributed abroad through a new service inaugurated by the United Nations Educational, Scientific and Cultural Organization and the American Medical Library Association.

Under the new plan, American medical libraries will send lists of available duplicates to UNESCO. The UN organization will distribute the lists to foreign libraries and handle requests for the material listed.

At present, foreign libraries will not be able to offer many publications in return, but the plan calls for eventual establishment of a multi-lateral exchange in which the American libraries would receive foreign publications.

Science News Letter, March 13, 1948

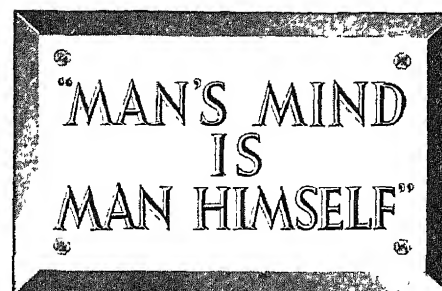
CHEMISTRY

New Research Announced on Salt Solutions and Metals

➤ A NEW study of metals in contact with common salt solutions is being undertaken by Dr. Donald MacGillavry, Jr., associate professor of chemistry at Clark University, at Worcester, Mass., under a contract with the Navy.

The new research will involve the measurement of electric potentials, requiring the development of new precision measuring techniques, it was stated. The project was proposed to the Navy by Dr. MacGillavry, who has done previous work in the field.

Science News Letter, March 13, 1948



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☛ **TAIL SIGN** for trucks and buses enables the driver to let cars behind know when the road ahead is clear so that they can pass. The truck driver merely presses a button; the tail sign lights up to display the words "OKAY—PASS."

Science News Letter, March 13, 1948

☛ **FOAMGLAS** insulation, for both hot and cold pipes, indoors or outdoors, comes in half sections of various sizes to fit any pipe. The non-combustible material, of true glass composition, is an excellent insulator, is unaffected by humidity and resists chemical fumes.

Science News Letter, March 13, 1948

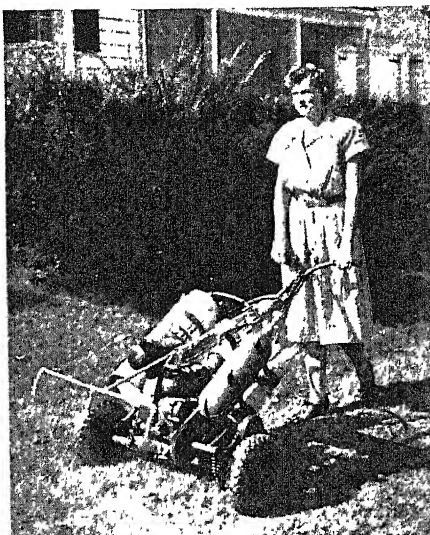
☛ **PORTABLE POWERED** helper machine for on-the-spot repair work, 32 inches high and mounted on three caster legs, has interchangeable tools for grinding, buffing, drilling, sawing, sanding and other operations on metals or wood. It operates on ordinary household electric current.

Science News Letter, March 13, 1948

☛ **LOW-COST BINOCULARS**, for use in theaters, hunting or in nature study, are made of six pieces of phenolic plastic, together with the necessary lenses. The lightweight instrument, which fits the ordinary shirt pocket, has a wide field of vision.

Science News Letter, March 13, 1948

☛ **SPRAYER**, to apply fertilizer, weed-



killing chemicals or insecticides to lawns, is attached to the lawnmower as shown in the picture and uses a tank of compressed carbon dioxide gas instead of the pump usually used in spray units. The combination sprays as it mows.

Science News Letter, March 13, 1948

☛ **HEATING CABLE**, which operates on ordinary household electric current, can be stretched along the eaves of a house to prevent the formation of overhanging ice, or can be used to clear icy doorsteps or to warm garden soil. It is a lead-covered flexible cable, one-quarter of an inch thick.

Science News Letter, March 13, 1948

☛ **REAR-SEAT RADIO** speaker, which may also be installed in a trailer, permits all passengers in an automobile to hear without the radio receiver volume necessary with the instrument in its usual place in the front panel. The rear-seat speaker is installed in the space behind the seat.

Science News Letter, March 13, 1948

☛ **FLASHLIGHT** for policemen directing traffic shows either green or red by pushing a button that revolves a rotating sleeve. The color changes in this recently patented device is due to colored disks within a tube which is fixed in front of the light-end of an ordinary flashlight tube.

Science News Letter, March 13, 1948

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Question Box

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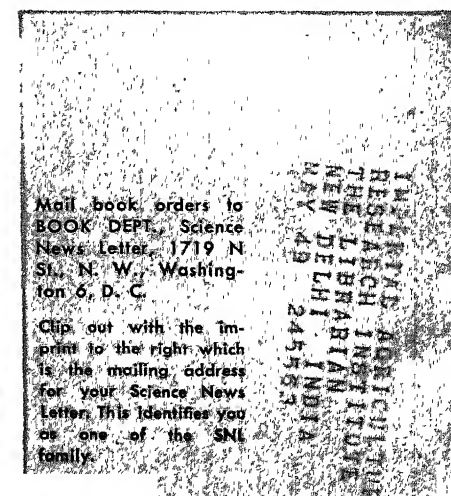
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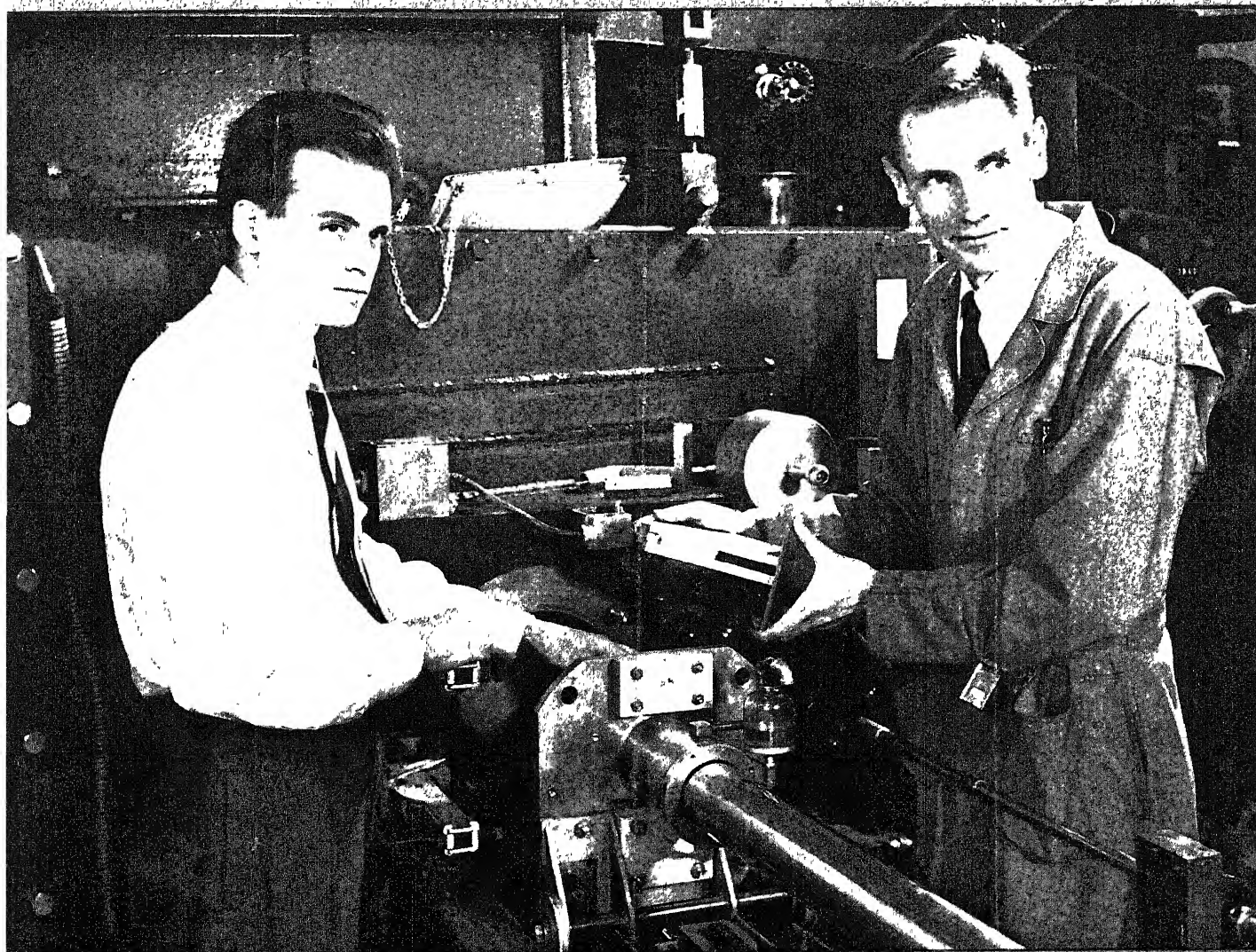


SCIENCE NEWS LETTER

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17 APR 1948

THE WEEKLY SUMMARY OF CURRENT SCIENCE • MARCH 20, 1948



Meson Makers

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A SCIENCE SERVICE PUBLICATION

MEDICINE

Hasten Stroke Recovery

Injection with procaine hydrochloride has brought improvement within 10 minutes after a seizure of apoplexy. May lessen permanent brain damage.

➤ AN "emergency treatment" can now speed recovery from apoplexy, or stroke as it is popularly called. It is reported by Drs. N. C. Gilbert and Geza de Takats of St. Luke's Hospital, Chicago, in the *Journal of the American Medical Association*, (March 6). The new method may lessen permanent brain damage.

The treatment consists in the injection of a local anesthetic, procaine hydrochloride, into a mass of nerve cells near the vertebrae at the base of the neck. Improvement should come within 10 minutes. The patient should recover consciousness, be able to speak or to speak more clearly, move arms and legs and flaccid, or limp, paralysis should be abolished.

While some patients improve anyway during the first few hours after a stroke of apoplexy, they do not do this within the first few minutes, the physicians point out.

A good response to this treatment was obtained in 19 of 25 patients. The results, the physicians say, "suggest that a less passive attitude should be taken in regard to the treatment of apoplexy."

The earlier the treatment is begun, the better the chances for speeding recovery. If improvement does not follow or the patient relapses, a second injection should be given. At present they give the treatment daily until no further

improvement is seen in the patient.

Results will be better in some kinds of apoplexy than in others. If the apoplexy is due to hemorrhage in the brain, the treatment is least effective, and is not recommended. If the apoplexy is due to a thrombus, that is, a clot in a blood vessel of the brain, the injection treatment may help and should be given.

The treatment is most effective in a third kind of apoplexy, that due to a clot which formed in a blood vessel elsewhere in the body and which was carried by the circulation to a smaller blood vessel in the brain. While all 10 patients with this condition, called cerebral embolism, improved immediately, the treatment did not necessarily change the course of the disease and one of them died on the fifth day. Patients who get apoplexy of this type are usually younger and have previously had rheumatic or other heart trouble or embolism elsewhere in the body.

With the injection treatment, other measures are also advised by the Chicago physicians. Important among these is an oxygen tent with the patient placed in a position to help the drainage of mucus so that he will not get pneumonia which is the biggest cause of death in patients who survive the first 48 hours after an apoplectic stroke.

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BIOCHEMISTRY

Explain Fat in Diabetes

➤ AN explanation for the idea that overweight has something to do with the onset of diabetes is given by studies of Drs. M. C. Nath and H. D. Brahmachari, of the University at Nagpur, India, and reported in the British scientific journal, *Nature* (Jan. 3).

Chemicals found in the body during the breakdown of fat, known as acetone or ketone bodies, "can be held responsible for the onset in the long run of diabetes mellitus," they state.

These chemicals are present in abnormal amounts in both blood and urine in diabetes. Normally they are oxidized further in the body and are

capable of furnishing a large amount of energy. In diabetes, either the body cannot oxidize them further for energy production or they are produced in excessive amounts.

Their accumulation, the Indian scientists state, is responsible for either lowering the production of insulin or decreasing its potency in bringing about utilization of sugars and starches.

First clue to the fact that the acetone bodies can lower the potency of insulin came when the scientists injected the acetone bodies into normal rabbits. The rabbits lost their ability to tolerate starches and sugars and got too much

sugar in their blood, as diabetics do.

Next the scientists tested the chemicals in animals that had their pancreases removed at different times. The pancreas is the gland that produces insulin. After the acetone bodies were injected, these animals at first produced insulin that was 50% more potent than the insulin from pancreases of normal animals. But this was followed by a gradual reduction in potency of the insulin, so that 70 days after injection of the chemicals, the insulin from the pancreases removed at that time was 50% below normal potency.

Science News Letter, March 20, 1948

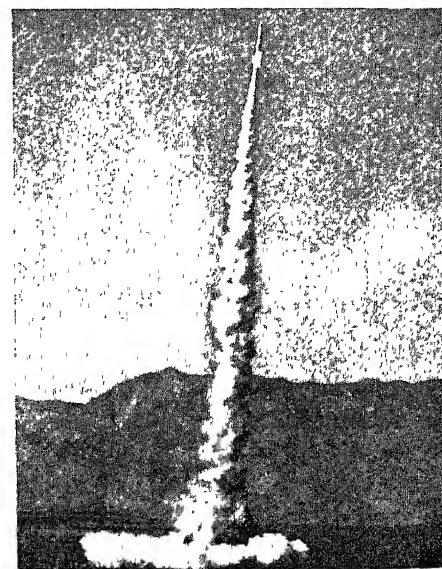
AERONAUTICS

Instruments Carried into Upper Air by New Missile

➤ AMERICAN scientists have a new, high-speed research vehicle for upper air exploration. Called the "aerobee," the new missile is smaller than the famous German V-2, most-used missile for carrying of scientific instruments into the little-known upper atmosphere.

In its first publicized firing at White Sands, N. Mex., the aerobee climbed to 78 miles altitude and reached a speed of 4,400 feet per second, or approximately 3,000 miles per hour. Unlike the V-2, the new liquid-fueled missile is designed primarily for carrying instruments into the upper atmosphere.

Science News Letter, March 20, 1948



NEW LIQUID-FUELED MISSILE
—Shown here leaving the launching rack, the aerobee will be used to carry scientific instruments for upper air exploration.

MEDICINE

11 MAY 1948

New Antibiotic Is Potent

Polymyxin, now undergoing trial, may replace streptomycin in the treatment of some diseases. Found 1000 times more effective against Friedlander's germs.

➤ A NEW anti-germ chemical from a bacillus commonly found in soil and water that appears better than streptomycin and may replace it in treatment of some serious diseases is under trial at the Johns Hopkins Hospital, Baltimore, Md.

Results in the first seven patients who got this new remedy were reported by Drs. Emanuel B. Schoenbach, Morton S. Bryer, Elinor A. Bliss and Perrin Long of the Johns Hopkins School of Medicine at the Johns Hopkins Medical Society meeting.

Polymyxin is the name of the new, "uniquely effective" antibiotic. It was discovered less than a year ago by two research teams working independently, Drs. R. G. Benedict and A. F. Langlykke of the U. S. Department of Agriculture's northern regional research laboratory at Peoria, Ill., and Dr. Harold White and associates at the American Cyanamid Company.

Whooping Cough

A six-weeks-old baby and his 13-months-old brother who were seriously ill with whooping cough are among the seven patients helped by polymyxin in its first trials. The little baby's temperature had reached 103 degrees Fahrenheit. Within one day after polymyxin was started, his temperature was normal. While the Hopkins doctors are too cautious to say the new remedy saved the baby's life, they and other doctors know that whooping cough in so young an infant is always serious, often fatal.

An 11-months-old baby with a severe burn that became infected with the blue pus-forming germ, *Bacillus pyocyaneus*, had been given every other kind of treatment without effect. Within six days, polymyxin had cleared up the infection so the baby could have skin grafting done to replace the tissue destroyed by the burn.

Two units of polymyxin, the Hopkins scientists found, would stop the growth of a germ that 50 units of streptomycin did not stop. This finding was made when they tested the new drug in the laboratory against the germ cause of a severe skin infection in another little boy. When the laboratory

tests showed the polymyxin would be effective, it was given to the boy and his infection cleared up.

Polymyxin is not, as far as is known, effective against tuberculosis germs against which streptomycin is powerful. But it is more effective than streptomycin against most gram negative germs. These germs do not cause serious illness as often as, for example, the streptococci against which penicillin is so effective. But when the gram negative germs do cause serious illness, it is worse than the illnesses caused by gram positive germs such as streptococci.

Plague, undulant fever, tularemia (rabbit fever), certain types of meningitis and of blood poisoning and wound infections, bacillary dysentery, typhoid and paratyphoid fevers and many types of urinary tract infection may be remedied by polymyxin, if it comes up to present expectations. The Hopkins scientists are continuing their studies and hope to try it on more patients with different ailments.

Good results have already been obtained in two cases of undulant fever, though with a disease characterized by frequent relapses as this one is, it is too soon to know whether polymyxin is a real cure.

Undulant Fever

One patient was a 39-year-old housewife who had an acute attack of undulant fever. Within eight days after polymyxin was started, her temperature had dropped from 106 degrees Fahrenheit to normal. The drug was given for five more days, and her temperature remained at normal. The drug was then stopped and one week later she could be discharged from the hospital as "well."

The drug brought the temperature to normal in another undulant fever patient who had the disease in chronic form and had been sick for two years off and on. Both these patients will be watched for possible relapses. If there are none, polymyxin will have done what no other treatment has so far.

Only death among the seven patients was that of a 58-year-old man who had been ill since last October. He had meningitis due to a germ called Fried-

lander's bacillus. He was sick for three months before he came to the hospital, and polymyxin had not been tried until after nothing else helped.

He began to get better with polymyxin treatment. His temperature was down to normal in four days, and cultures of his blood had no more of the Friedlander's germs. Then, suddenly, an unsuspected abscess behind his appendix opened between two vertebrae and pus from it spread into his spinal canal. The man got very sick again and within a day was dead. The reason the abscess had not been suspected was that the man was so sick when he reached the hospital the doctors could not examine him thoroughly enough to make the diagnosis. All they could do was treat the infection which they knew was present because of the fever and blood tests.

Friedlander's Bacillus

Polymyxin's power against this extremely dangerous Friedlander's bacillus, however, was shown both in the patient's response at first and in laboratory tests. These tests showed that polymyxin was more than 1000 times more effective than streptomycin against the germs making the patient sick. The growth of these germs in the test tube was stopped by an amount of polymyxin that weighed only one-thousandth of an amount of streptomycin which the germs were still able to resist.

Polymyxin is given by hypodermic injection into the muscles every three hours at present. But further studies may show that it can be given less often. It is safe and so far there have been no unpleasant side-effects in the patients with one exception. This was the development of fever after 10 days of polymyxin treatment in the man who had had undulant fever for two years. This was probably an allergic reaction, and may not occur often.

Science News Letter, March 20, 1948

ASTRONOMY

New Moon Discovered For Planet Uranus

➤ A NEW moon has been discovered, but it will be no help to romance or songwriters.

The moon, or satellite, is closer to the distant planet, Uranus, than to the earth. Even astronomers peering through the 82-inch telescope of the McDonald Observatory of the Universities of Texas and Chicago at Fort Davis, Texas, cannot see it.

Uranus' newly-discovered moon was found on photographic plates. It shows up on a photograph after two or three minutes exposure, reports Dr. Gerard Kuiper, director of the observatory.

The newest moon found in our solar system was spotted, via photographs, during the period when the observatory was making studies of possible life on Mars. It was first located on Feb. 15, and the discovery has since been con-

firmed by more recent photographs.

Tiny compared with the earth's moon, the new satellite of Uranus is probably not over 300 miles in diameter, Dr. Kuiper estimates. It is well within the orbit of four previously-known moons of Uranus and is an estimated 75,000 miles from the planet. The moon completes its path around Uranus in about 30 hours.

Science News Letter, March 20, 1948

MEDICINE

Mass Detection of Cancer

A new simple and quick blood test for this disease has been discovered which may be used as a mass screening agent such as X-rays are for unsuspected tuberculosis.

➤ A NEW blood test for detecting unsuspected cancer was announced by Drs. Maurice M. Black, Herman Bolker and Israel S. Kleiner of the Brooklyn Cancer Institute and New York Hospital at the Atlantic City meeting of the American Association for Cancer Research.

The test is so simple and quick that, if further study confirms its value, it could be used as a mass screening agent to detect cancer in the population something as X-rays are now used in large population groups to detect unsuspected tuberculosis.

The test is made by putting a small amount of the person's blood plasma in a glass tube, diluting it with distilled water and taking a reading of the light transmitted through the plasma with a photoelectric colorimeter. The tube of diluted plasma is then put in vigorously boiling water for 10 seconds and a second light transmission reading is made. The heat coagulates the plasma and the difference between heated and unheated plasma is measured in terms of heat coagulation.

Blood plasma from cancer patients coagulates much faster when heated than blood plasma from healthy persons or from persons sick with diseases other than cancer. The coagulation measure, Dr. Black and associates believe, can therefore be used to detect the presence of cancer.

The test developed from studies the scientists were making with another blood test for cancer reported at the International Cancer Congress last fall. (See SNL, Sept. 13.) In this earlier test, it was found that blood plasma from cancer patients quickly decolorized a dye, methylene blue.

Both tests have now been tried on several hundred persons, some healthy, some cancer patients and some sick with other diseases. The two tests can be made in 15 minutes and when combined have an accuracy of more than 95% in showing the presence of cancer.

The new test depends on the presence in the blood of fibrinogen, chemical which is involved in blood clotting. But some other as yet unknown factors are believed also to be involved in the changes in heat coagulation of plasma from cancer patients.

The new test, Dr. Black said, is "particularly interesting from the prognostic standpoint." It gives an objective means of following the effects of treatment.

Inhibit Enzymes in Cancer

➤ A CHEMICAL adaptation treatment that has been helping patients with leukemia, Hodgkin's disease and cancer was reported by the same group. Its chief importance lies in the clues it gives to possible chemical solution of the cancer problem (See SNL, Sept. 20). The chemicals used are enzyme inhibitors. They interfere with or block enzyme chemicals needed by the cancer cells. But the cancer cells soon adapt themselves to life without one of these enzymes. At this point, the doctors do some adapting. They adapt the treatment by giving different chemicals, which stop a different set of enzymes needed by the cancer cells. When the cancer cells, in turn, adapt to this situation, the doctors switch chemicals again.

Science News Letter, March 20, 1948

INVENTION

New Flaming Method Rids Cottonseed of Lint

➤ PRICE C. McLemore of Montgomery, Ala., already well known as the originator of the flame-cultivation method for killing weeds, offers a new flaming method for ridding cottonseed of lint. It consists essentially of wetting the seed with a highly flammable liquid like gasoline or alcohol, then setting fire to it. The resulting flash flame effectively removes the lint, yet does not affect the germination of the seed. Patent 2,437,397 has been issued on this invention.

Science News Letter, March 20, 1948

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NUCLEAR PHYSICS

How Mesons Were Made

Their creation may open up unprecedented opportunities for understanding mysterious sub-nuclear processes, cyclotron inventor believes.

See Front Cover

➤ CREATION of mesons artificially in the giant Berkeley cyclotron is called "the most significant event in fundamental nuclear studies since the discovery of uranium fission." (See SNL, March 13).

Tracks of the mesons were observed on photographic emulsion plates placed adjacent to targets of carbon, beryllium or other materials against which the great cyclotron hurls 380,000,000 electron-volt alpha particles, the nuclei of helium atoms.

Dr. Ernest O. Lawrence, inventor of the cyclotron, Nobelist, and director of the University of California radiation laboratory, believes that the development opens up unprecedented opportunities for understanding mysterious sub-nuclear processes, particularly the nature of the force which holds the nucleus together and subtle influences of atomic particles on each other. The meson is the best tool ever obtained for examining these forces. Because the largest cyclotron possesses just barely enough power to produce low energy mesons, super atom-smashers must be built.

Men Who Did Experiments

The two men who did the experiments, Dr. Eugene Gardner, research physicist in the Radiation Laboratory, and Dr. C. M. G. Lattes, a Brazilian scientist from the University of Sao Paulo, who came to Berkeley recently on a Rockefeller Foundation Fellowship, are shown on the cover of this week's SCIENCE NEWS LETTER.

In the photograph, Dr. Gardner is holding an experimental assembly of meson apparatus which Dr. Lattes is about to help put in the cyclotron chamber.

Dr. Lattes for the past two years worked with a group of scientists at the University of Bristol, Bristol, England. Dr. Lattes, Dr. C. F. Powell, and Dr. G. P. S. Occhialini, working at Bristol, have led in the application of specialized techniques for studying cosmic rays by means of photographic emulsions. Drs. Gardner and Lattes and Prof. Robert R.

Serber, nuclear physicist in charge of the theoretical work in the Radiation Laboratory, joined with Drs. Gardner and Lattes in explaining how the mesons were observed.

Before the Bristol findings were revealed, it was generally believed that only one kind of meson existed. This particle was suggested in the 1930's by a Japanese scientist, Dr. Hideki Yukawa, to explain a gap in the atomic theory of that day; such a particle was later found in cloud chamber experiments by Dr. Carl D. Anderson, of California Institute of Technology, and he called it a mesotron. The names meson and mesotron have been used interchangeably.

Meson Found at Sea Level

Dr. Anderson's meson was found to have a mass of about 200 times that of the electron and either a positive or negative charge of electricity. Found at sea level, this meson has a life time of two millionths of a second and energies up to billions of electron volts. It is a secondary cosmic ray particle, and scientists considered that it was made as a result of the bombardment by heavy,

energetic primary cosmic rays entering the earth's atmosphere from outer space and colliding with nuclei of the atmosphere.

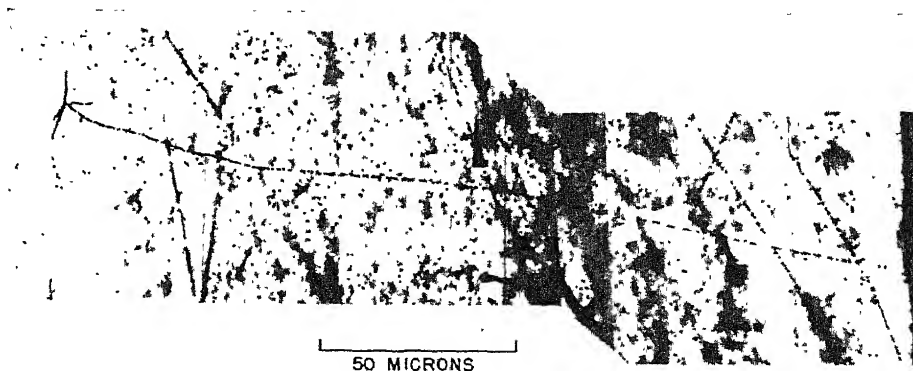
Scientists tried to tailor their theories to fit the idea that only this one kind of meson existed. One of their great difficulties was that this meson did not interact with atomic nuclei. Its birth could not be explained adequately, and its brief existence was climaxed by oblivion. But it was obvious that these light mesons were the product of nuclear particle collisions.

Years of Careful Study

During years of careful study and development of special techniques, the scientists at Bristol, taking their emulsions to mountain tops in the Andes and Pyrenees, were able to explain how the light meson often originated from a heavier meson.

They found on their photographic emulsions, mesons of a mass of about 320 times that of the electron. They found that these heavy mesons were both positively and negatively charged, and there was some evidence that neutral mesons also existed.

All of these heavy mesons were studied at very low energies, of a few million electron-volts, when they were close to or undergoing disintegration. At these energies, the positively charged heavy mesons, being unable to penetrate the electrical barriers of positively charged nuclei, simply wandered through the photographic emulsion until they



MESON TRACK—is shown in this photomicrograph. The edge of the emulsion plate is at right. In the beginning, with an energy of 4 million electron volts, the track of the meson is light, becoming heavier as it reaches the point of capture by a nucleus. It explodes the capturing nucleus, resulting in a "star". The reason for lightness of track at right, heaviness near star, is that a charged particle will affect more electrons of atoms through which it is passing as it loses energy. Dark parallel lines on the right hand edge show the edge of the photographic plate. The scale gives some idea of the length of the track—about four one-hundredths of an inch long.

disintegrated, giving birth to light mesons.

However, the negatively charged heavy mesons were greedily swallowed by nuclei, resulting in the detonation of the capturing nuclei into showers of particles called "stars". At the end of their course, when nearing capture, the mesons made a wavy track. The wavy track is made because the particle is relatively light, and, at the extremely low energies involved, it takes a severe buffeting from nuclei in the emulsion.

The negative heavy mesons are the type which have been produced in the giant Berkeley cyclotron. The Berkeley research shows they have a mass of 313. The characteristic wavy track and the

"stars" resulting from the detonation of nuclei are also observed. About half the meson tracks observed end in "stars".

Theoretical calculations indicate that mesons were being made from the beginning of the operation of the giant cyclotron over a year ago. The first plate exposed on Feb. 21 of this year for 30 seconds yielded 100 times as many mesons per plate as were obtained in the Andes from cosmic rays in 45 days. This is 10,000,000 times as many mesons per second in the cyclotron as on a mountain top. On the first night one track in 10,000 was a meson, while now the method has been improved so that one track in 10 is a meson.

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PHYSIOLOGY

Sex Affects Skin's Color

Spectrophotometric studies show that a woman's skin is paler in color than a man's. Sex glands produce hormones which regulate the skin color.

➤ SEX differences and variations in sex gland activity are reflected in skin color. Spectrophotometric studies showing these were reported by Dr. Edward A. Edwards of Harvard Medical School and Tufts College Medical School at the meeting of the Optical Society of America in New York.

The spectrophotometer is an instrument used to analyze colors in a substance from the light it gives off. Doctors every day look at the skin color of their patients for clues to their state of health. The spectrophotometer gives the same kind of information and much more. It detects not only the quantity of blood present in the skin but also how well it is supplied with oxygen.

With the aid of this instrument, Dr. Edwards and Dr. S. Q. Duntley of Massachusetts Institute of Technology have made an optical reconstruction of human skin. This was done by stripping a piece of skin off a cadaver. After the blood was washed out of it, the skin was mounted against the spectrophotometer window. Backing it was a parallel-sided glass cell filled with oxyhemoglobin solution. Behind this was a second glass cell filled with reduced hemoglobin solution, that is, blood's red color chemical minus oxygen. The "skin" was completed with a block of fat. By varying the concentrations of the two hemoglobin solutions, curves simulating various body

areas were obtained by this method.

The studies with the optically reconstructed skin were confirmed by studying the palm of a normal young man whose arm was bound by a tourniquet.

MEDICINE

Chemical Stops Hormone

A new principle in the treatment of cancer may result from the discovery that an anti-vitamin can interfere with the action of a female sex hormone.

➤ DISCOVERY that an anti-vitamin can interfere with the activity of a hormone, specifically a female sex hormone, was announced by Dr. Roy Hertz of the National Cancer Institute at the meeting of the American Association for Cancer Research in Atlantic City.

A new principle in treatment of disease may result. This new principle could apply not only to treatment of cancer but also treatment of many other diseases in which glands and their hormones are involved.

Dr. Hertz worked with chickens and monkeys. He gave the animals doses of a chemical called aminopterin. This is an antagonist, or anti-vitamin, to folic acid. This anti-vitamin stopped the

A woman's skin differs from a man's by being paler in color, showing less blood and less melanin, Dr. Edwards reported.

Melanin is a brown pigment found in large quantities in the dark races and is a prominent factor in sun tanning. The female skin, though having less of this pigment than the male skin, has more of another pigment, carotene. This is the chemical that gives carrots their color, and that in human skin is derived from vegetables, egg yolk and a few other sources of carotene.

The hormones produced by the sex glands regulate the skin color. Male castrates showed a sallow color, due mainly to lack of blood supply. This could easily be corrected by doses of synthetic male hormone. These patients also had skin that did not tan as much as normal male skin, and which contained more carotene than normal male skin. Their skin was more like that of a woman's in these respects. These differences were also corrected by male hormone treatment.

The effect of hormones on female skin color was found in studies of women whose ovaries had been removed and also in periodic changes in skin color corresponding to stages of the menstrual cycle.

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growth response of chick tissues to the female hormone, estrogen.

The effect of hormones on the growth of tissues has recently been considered important in connection with cancer, which is a problem of abnormal growth. A relation between sex hormones and cancer of the breast is also known to exist and a number of scientists are working on this phase of the cancer problem. Some of them have been discussing their work at this meeting.

Cancers of the breast and uterus are known to have a certain dependence on stimulation by estrogens. In breast cancer it has been common practice to remove the patient's ovaries, or destroy them by X-ray or radium treatment.

The object of this is to stop their production of estrogen, in the hope of stopping the estrogen-stimulating effect on the cancer.

Dr. Hertz' discovery of the anti-folic acid chemical's effect opens the possibility of using this chemical instead of removing or irradiating the ovaries. It might prove even more effective, because it would also stop the activity of estrogen from sources other than the ovaries.

The relation between folic acid and estrogen stimulation was first observed

by putting chicks on diets that contained none of this vitamin. Trial of the anti-folic acid chemical came next. Diets lacking other vitamins, such as riboflavin, pantothenic acid and pyridoxine, were also tested. But they did not have much effect on estrogen stimulation.

The possibility that other hormones may depend on "trace factors" in the diet, such as vitamins, is opened by the discovery.

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AERONAUTICS-RADIO

Calculate Speed by Radio

To measure how fast speedy planes travel, an improved single ground-based radio station has been worked out. Plane must fly directly to or away from station.

► **FASTEST-TRAVELING** airplanes may have their speeds accurately determined by an improved single ground-based radio-frequency measuring device, Boeing Aircraft Company, Seattle, revealed.

The new system is based on the so-called radio Doppler system which was worked out by the National Advisory Committee for Aeronautics at Langley Field, Va., in 1941. The earlier development made use of two ground stations 14 miles apart and a radio transmitter in the plane. The new system uses only one ground station.

In the new Boeing system, the ground station transmits to the plane. A receiver in the plane picks up this transmission, doubles its frequency and gives it to a transmitter for sending back to the ground station. At the ground station, the original frequency is likewise doubled. When the two doubled frequencies are compared, that is, heterodyned or "beat" against each other, their difference gives data from which the speed of the plane is easily determined.

The principle behind the action is similar to what takes place with sound from a rapidly approaching locomotive. This sound becomes higher-pitched as the train approaches, and becomes lower-pitched as the train goes away from the listener. Reason for the change in pitch is that sound is made up of air waves traveling outward from their source. If the source is approaching, the waves reach the listener more rapidly, making the sound seem higher in pitch.

Radio emissions oscillate, or vibrate.

Although they travel with the speed of light, there is a difference in their frequency coming and going, just as with the sound from a speeding locomotive's whistle. Furthermore, this difference can be measured with great accuracy on an oscillograph in the new instrument.

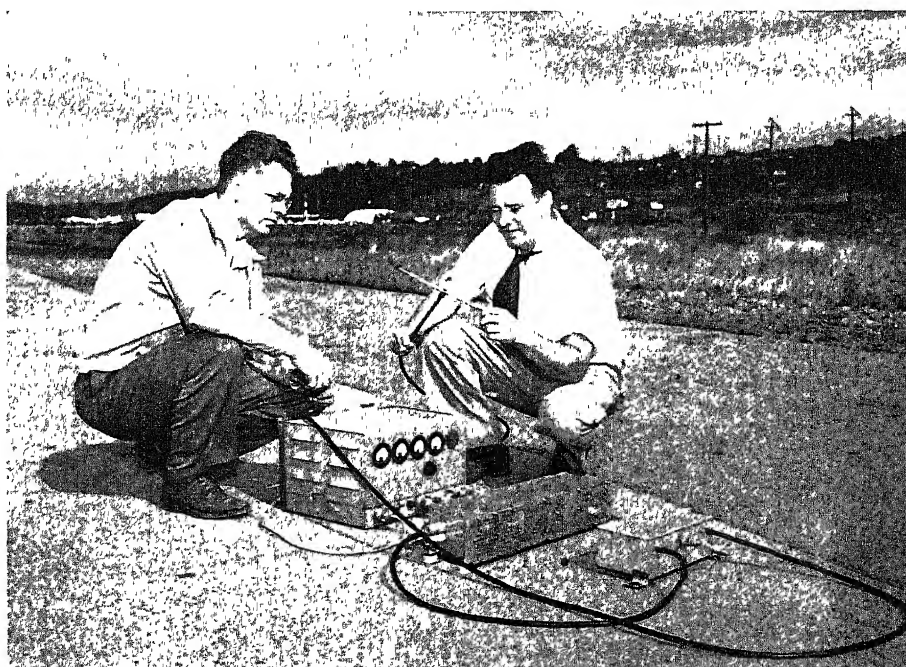
With the new system, the airplane may fly at any altitude and anywhere within a 50-mile radius of one ground

station, but its speed can be measured only when it is flying directly to or away from the station. The oscillograph of the instrument can clock the plane during a flight of several miles, indicating exact speed at every instant.

A slow-moving plane, at speeds up to perhaps 150 miles an hour, can be clocked with a stop watch. For faster speeds this method is inaccurate. In official tests under the sponsorship of the Federation Aeronautique Internationale, speeds are measured by an elaborate high-speed camera installation.

In the radio Doppler system worked out by NACA, the test plane had to fly at low altitude directly on the course between the two ground stations. Receivers at each station were tuned to the transmitter carried by the plane before it left the ground, and also to an auxiliary ground transmitter operating on nearly the same frequency. Thus both receivers got a heterodyne whistle at the same audible frequency. A telephone wire connected the two stations and fed the two whistles into an oscillograph. As the plane flew the course, the station behind it got a lower-pitched note and the one ahead a higher pitched note. The frequency difference showed on the oscillograph.

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MEASURING SPEED OF FAST PLANES—This is the equipment used in the plane with the improved Doppler system of measuring speed. It receives a radio beam from a ground station, doubles its frequency, and returns it to the ground.

MEDICINE

Avert Invalidism in Man By Glass Button in Belly

➤ A MAN in New York owes his health to a glass button which he carries with him. The glass button occupies a unique position—it is under his skin on the lower right hand side of his abdomen. The man's case is reported by the surgeon who inserted the button, Dr. Jere W. Lord, Jr., of that city in the *Journal of the American Medical Association* (March 13).

The patient had been ill with cirrhosis of the liver. He was emaciated and had an accumulation of fluid in his abdominal cavity. The usual procedure, which failed to help him, calls for puncturing the cavity where the fluid has accumulated and draining it off. The patient may in this way lose several quarts of body fluid which contains protein. This causes a wasting of the body and is hard on the patient.

Dr. Lord combined two techniques with success in operating on this patient. He inserted a glass button which had brought temporary relief in other patients after its introduction by Drs. R. C. Crosby and E. A. Cooney in 1946, and he stripped the muscles of their connective tissues to expose the lymph glands at the suggestion of Dr. Irving S. Wright.

The glass button, which is inserted on the lower right hand side, has a cap on it to prevent the passageway from being blocked by membranous tissue. The fluid drains through this passage into a pocket in the body made by the doctor by removing the connective tissue covering the muscles. This exposes the lymph vessels which absorb the fluid.

Improvement was noted in this patient within three to four weeks, when the fluid in this artificially-made pocket disappeared. Within five and one-half months the patient showed no signs of ascites, or fluid accumulation, and was able to carry on his usual activities.

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BIOLOGY

Your Antibodies Have Long-Distance Action

➤ ANTIBODIES, your body's front line defenses against disease germs, have a long-distance action equivalent to your being able to "disintegrate an opponent from a distance of 60 feet," Dr. Alexandre Rothen, Rockefeller Institute for Medical Research scientist, estimates.

An electronic effect, or a "system of extended resonating oscillators," may account for this long-distance action. Enzymes, such as the trypsin in digestive juices which breaks down meat and other proteins, also have this long-distance action. It apparently is a property of protein-like chemicals which consist of extremely large molecules.

Trypsin's long-range action can be shown by coating a glass microscope slide with a protein, covering this with a blanket of jelly and then applying a coating of trypsin. The protein is broken down by the trypsin in spite of the solid layer of jelly between them.

This long-range action of body chemicals observed by biologists seems to contradict the classical chemical conception that molecules must touch before they react.

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ELECTRONICS

Dry Plastic Raindrops Are Used in Radar Study

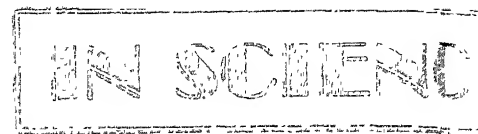
➤ PLASTIC droplets, instead of raindrops, are being used by Westinghouse scientists to find out why clouds, rain and wet snow frequently block out very short radar waves before they reach their target.

These dry drops, Edward J. Duckett, of Westinghouse Research Laboratories, Pittsburgh, explained, are similar to real rain in size and shape and have the same electrical behavior. They serve as targets for ultra-short waves fired from a special radar set.

When the ultra-short waves less than a half-inch long were put into service they met interference from rain clouds, unlike the earlier radar which used "longer waves. Instead of passing through the clouds, they bounced back to the radar receiver, thus obscuring the target. The use of these very short waves is highly desirable because they give a clearer picture on the radar scope than do longer waves.

To make the tests, the scientists would use real rain if they could get the kind they need just when they want it. The results of the work may have some bearing on weather forecasting. The fact that clouds and rain do stop radar of certain wavelengths has already been put to work in locating storm areas.

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CHEMISTRY

New Chemical Weapon Against Insects Announced

➤ ANOTHER new chemical weapon against insects has been announced by the Du Pont Company. The latest insecticide is called Marlate. Chemically, it is bis (methoxyphenyl) trichloroethane. First tests indicate that Marlate is not dangerous to animals or plants but is effective against many insects.

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GENERAL SCIENCE

Man's Cerebrum Offers Hope for Lasting Peace

➤ MAN'S cerebrum—a part of his brain—is his best bet for lasting peace, a scientist said.

Dr. Ralph W. Gerard, professor of physiology at the University of Chicago, discussed the role of the brain in international affairs as a guest of Watson Davis, director of Science Service, on Adventures in Science heard over the Columbia network.

Dr. Gerard described the cerebrum as "that part of the brain lending itself to cooperative, altruistic, unselfish behavior.

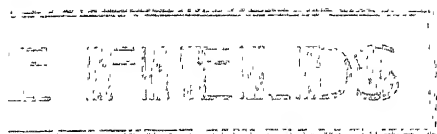
"In the great panorama of evolution, the selfish competitive aspect of the brain or of behavior has changed very little, but the newer parts of the brain have steadily increased—the cerebrum—of which man has such a tremendous amount," he declared.

From the standpoint of the brain, the difficulty is that "what man does with his brain can change very much faster than the brain itself can change," Dr. Gerard pointed out.

"The capacity or size of man's brain hasn't increased from historic or prehistoric times on," he pointed out. "On the other hand, the social activities that depend on the brain have changed a great deal in the past 10,000 years.

"But I don't think I'm entirely rash and idealistic in looking forward to a time when the cooperative aspects of behavior will develop to the extent that men will learn to get along with each other, and wars will be a matter of the past," the scientist concluded.

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GENERAL SCIENCE

Two of Three 18-Year-Olds Will Live to Retirement

➤ THE chances are fully two out of three that a young man now starting his working life at the age of 18 will live to his retirement age of 65. The chances for his father and his boss surviving to their retirement at age 65 are good, too. A 45-year-old man today has 70 in 100 chances of reaching age 65 and the chances for a 55-year-old man are 78 in 100.

These chances for reaching the retirement age of 65, calculated by statisticians of the Metropolitan Life Insurance Co., reflect the marked decline in mortality in the United States since the turn of the century.

In 1900 the young man of 18 had only 51 chances in 100 of surviving to age 65.

Mom's chances of surviving to old age are even better than Dad's. More than three-fourths of the women now under age 65 will live to attain that age. The woman of 45 today has better than 80 in 100 chances of living to 65 years, and the woman aged 55 today has 86 in 100 chances of celebrating her 65th birthday.

Age 65 may spell retirement from the job, but it does not mean the end of life. Men and women today are outliving the Biblical three score years and ten lifespan.

"Currently," the life insurance company's statisticians state, "white men who reach age 65 can expect to live an additional 12½ years, on the average. For white females there remain an average of 14¼ years."

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AGRICULTURE

Activated Charcoal Guards Plants from 2,4-D Harm

➤ CROP plants can be protected from harm by 2,4-D used for killing weeds by pre-planting treatment with powdered activated charcoal, a three-man team of agricultural scientists has discovered. The treatment is of especial value for crops that are set out as young plants already rooted.

The work was done as a joint research project for the U. S. Department of Agriculture and the Mississippi Agri-

cultural Experiment Station by Drs. H. Fred Arle, O. A. Leonard and V. C. Harris.

2,4-D is frequently sprayed on fields to kill weeds before the crop is planted or set out. However, there may be enough of it left to do serious harm to chemically sensitive crop plants.

In the present experiments sweet-potato sprouts were used. Part of them had their roots dusted with the activated charcoal powder before planting and the rest were left untreated as controls. The latter group suffered very high mortality when set out in the 2,4-D-poisoned soil, while the treated plants, though sustaining some losses, survived much better.

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METALLURGY

99.8% Pure Helium Gas Produced by Government

➤ THE purest helium ever distributed commercially, within 0.2% of absolutely pure helium, is now available, the U. S. Bureau of Mines disclosed. It will be known as "welding grade helium" because its principal uses will probably be in the so-called shielded-arc welding process.

Helium is the lighter-than-air non-combustible gas used in American balloons and dirigibles, and is produced only in the United States. It is taken from natural gas in northern Texas fields and one field on the Navaho Indian Reservation, Arizona-New Mexico. Production is entirely by the government in plants operated by the Bureau of Mines.

Helium for commercial uses until now has been 98.2% pure instead of the 99.8% new product. The impurities in the 98.2% product are harmless in balloons and dirigibles and have no deleterious effects in the various medical uses developed during the past 25 years.

This high-purity helium is made from the helium previously produced by passing the latter through an additional separation unit containing refrigerated coconut charcoal. This charcoal absorbs most of the impurities, largely nitrogen and hydrogen, but takes up very little helium.

In use in welding, the noncombustible helium forms a shield over the welding arc which keeps the oxygen of the air away from the heated metal to prevent oxidation. With the new high-purity helium, the welding industry will be able to develop new and better techniques, it is expected.

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PHYSICS

New Type Prism Extends Infra-Red Wavelengths

➤ A NEW instrument for science and industry has given wavelength measurements in a previously unknown range of the invisible infra-red spectrum, the Optical Society of America was told at a meeting in New York.

Measurements of infra-red wavelengths up to 38 microns—a micron is .00003937 inch—were made at the National Bureau of Standards in Washington, Dr. Earle K. Plyler reported. A prism made of thallium bromide and thallium iodide was used for the study.

The thallium bromide iodide prism, called KRS-5, has extended the wavelengths in the infra-red region from approximately 25 microns for potassium bromide prisms and about 15 microns for sodium chloride prisms.

The new prism gives scientists a new tool for studying materials in a range of the infra-red spectrum which they have not been able to explore before. KRS-5 is not now available commercially, but it may find important industrial applications in the future for analyzing materials.

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ARCHAEOLOGY

Baking Babylonian Bricks Makes Writing Legible

➤ BAKING ancient Babylonian bricks in a modern electric furnace makes their ages-old cuneiform inscriptions easy to read—if you can read cuneiform. The technique, developed by Prof. Ferris J. Stephens of Yale University, involves heating the inscribed tablets for a day at a temperature of 1,400 degrees Fahrenheit, letting them cool for two days, then piecing the fragments carefully together and cleaning out each wedge-shaped stroke under a low-power microscope.

Inscriptions on these ancient tablets, some of them dating back as far as 3000 B.C., range all the way from business contracts and records of divorce suits to learned mathematical treatises. Some of the contracts are done in duplicate: after the deal had been duly set down by the scribe on a clay tablet and sealed by the contracting parties, it was wrapped in a clay envelope and the whole thing written again on the outside of this. This made it harder for Babylonian big businessmen to "put something over" on each other.

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AGRICULTURE

JVA To Renew Palestine Land

Jordan Valley Authority proposed to trade salt water for fresh through a canal to the dry coastal plain where it will be used for irrigation.

By DR. FRANK THONE

➤ DIVIDED Palestine can still offer a fair prosperity to both Jew and Arab, each working his own garden separately. But a united Palestine, with Jew and Arab working together to make the most of the land's resources, could provide a living level so high that both would wonder why they ever quarreled.

So declares Dr. Walter C. Lowdermilk, until lately assistant chief of the U. S. Soil Conservation Commission, and world authority on the redemption and resettlement of lost and wasted lands. Leading exponent of the boldly conceived project known as the JVA (for Jordan Valley Authority), he points out that although cooperation between the seemingly irreconcilable disputants is needed for its full realization, there are parts that can be operated as independent units, until the time comes when they can be fitted as integral links into the completed chain.

Profitable Undertaking

Basic idea of the JVA is a proposal to trade salt water for fresh—with a profit on both sides of the bargain. That kind of a deal should attract anyone with a sharp eye for business, be he Arab or Jew—or even Yankee. It may sound as fantastic as something out of the Arabian Nights Tales, but it is a perfectly practical modern engineering project. It has been declared financially feasible, too, by hardheaded bankers—able to retire the required capital investment of a quarter-billion dollars in 50 years, paying three percent interest the while.

The big trade, as proposed in the JVA project, is to divert a considerable part of the fresh water from the north, that now finds its way uselessly to the Dead Sea by way of the River Jordan, through a canal out to the dry coastal plain, there to be used for irrigation. To maintain the Dead Sea at its present level, a second canal will carry water from the Mediterranean into the Jordan valley, then follow a course parallel to the river until it empties into that great lake of concentrated brine. Since the Dead Sea is 1,300 feet lower than the Medi-

terranean, the plan is to build two great hydroelectric plants. Further revenues are expected from chemicals extracted from strong brine of the Dead Sea, especially magnesium, potash, iodine and bromine.

It is easier to understand Palestine by comparing it with southern California. Dr. Lowdermilk, and other scientists as well, have called attention to the striking resemblances between the two regions, in both geography and climate.

The basic pattern of both is the same: a rather dry coastal plain that runs up to a fairly high ridge, dropping off on the other side into an interior valley that at its southern end dips below sea level. Mountains to the north catch rain and snow, and make possible highly developed irrigation systems. This contrasts sharply with the extreme desert conditions that prevail in the deep southern valleys.

Parallels are not absolute, of course. Palestine has a big advantage in its underlying rocky structure. This is mainly limestone, which is honeycombed with caves and underground watercourses. These emerge as numerous springs, which help mightily in local irrigation works. Southern California's rock foundation is primarily granitic, which does not dissolve into water-carrying cavities as limestone does.

Centuries of Soil Abuse

Offsetting this disadvantage, southern California has newer, hence deeper and more fertile soils. The soils of Palestine have taken centuries of abuse, especially from nomadic tribes who in the past centuries have broken in, ruined the old balanced agricultural economy of the land, and provoked heavy soil erosion by overloading the hills with grazing flocks, particularly of goats. Dr. Lowdermilk estimates that since the Arabs brought their goats to those hills some 1,300 years ago, three feet of good soil has been washed off the hillsides. Upland slopes are left as bare rock; bottomlands are choked into malarial swamps with the silt. So there is plenty for modern agriculture and engineering to do.

You can even find a climatic "double"

in Palestine for most of the well-known places in southern California. Tel Aviv, on the coast, is the Los Angeles of the Middle East. Jericho, which is near the Dead Sea, has a climate like that of Palm Springs. Beersheba, southernmost Palestinian city, is the climatic analog of Riverside, while Tiberias, metropolis of present-day Galilee, has its California equivalent in San Bernardino.

There is much similarity in the crops of the two regions. The Biblical trilogy of abundance—corn, and oil, and wine—are California crops, too: barley and wheat are "corn," oil comes from olives, and vineyards were in Palestine even before the Children of Israel first came into the land. In modern Palestine as in California, citrus-fruit raising has become a major industry.

Need To End Present Strife

The great trade, of salt water for fresh, will become a reality only after Arabian-Jewish cooperation replaces the present condition of virtual civil war. However, even when that happier time comes, the entire scheme will not be put into operation at once; development has been planned for eight stages. And, fortunately, some of those stages can be started without waiting for the rest.

A beginning can be made, for example, at the northern end of the country, where the streams that eventually feed Lake Tiberias (the Biblical Sea of Galilee) come down from rainy Mt. Hermon and collect in swampy-shored Lake Huleh. The swamps can be drained and the waters channeled for irrigation farther downstream. About 37,000 acres of fertile land can be reclaimed for cultivation in this area alone. It should be possible to develop a good deal of water power in this short distance, for Lake Huleh is 230 feet above sea level and Lake Tiberias 700 feet below it. Since the entire Huleh district is included in the Jewish part of the new Palestinian state, much can be done here without waiting for Arab cooperation.

In Palestine there are some 40 of those desert watercourses known in the Arabic-speaking world as wadis; they would be called arroyos or gulches in our own West. Normally dry or at most carrying only a trickle of water, they occasionally catch a cloudburst and pour out destructive floods. The JVA project calls for putting dams across most of these and saving the storm waters that are now



DIVERTING EARTH'S WATERS
—A salt-water canal will route Mediterranean water into the Dead Sea, to replace fresh water from the Jordan river system, diverted for irrigation purposes through a second great canal. This picture shows fresh water being run onto salt flats near the Dead Sea to leach out the minerals and make the land suitable for cultivation.

worse than wasted. While the eventual aim is to have all these tamed wadis fit into the unified irrigation and water-power system, obviously they can be taken in hand one by one, by either Jews or Arabs, according to whose land they lie in.

A good deal of water is expected to be obtained by tapping the underground drainage system with wells. These also can be dug and operated separately; though it is true that power for pumping will be much cheaper when the major hydroelectric plants that depend on joint action by Arabs and Jews can be built.

These partial operations are not mere salvage of scraps. They represent a really respectable fraction of the total new acreage which it is hoped will eventually be brought under irrigation. The final figure is expected to be somewhere in the neighborhood of 750,000 acres. The partial reclamations which can be carried out by the Jews alone will amount to at least 340,000 acres, mostly in the now arid coastal plain. The Arabs can reclaim about 100,000 acres without Jewish help. Moreover, declares Dr. Lowdermilk, this new land can be added within

two years if work is started promptly.

Even for the full realization of the JVA project, some time will have to be spent in research on some of the unique problems involved in the handling of the great volume of sea water to be channeled from the Mediterranean into the Dead Sea. All hydroelectric plants now in existence are run by fresh water. What kind of metals, and what type of turbine, will be needed for the great power plants? There is a challenge to metallurgists and engineers alike.

Palestine, like all the Near and Middle East, is a land where earthquakes sometimes happen just as they do in Calif-

ornia. Some very careful planning and experimental work will be needed to protect the large-scale engineering structures that will eventually be built. Here is a big job for the new profession of geophysics.

These are only a couple of the problems which the JVA engineers and administrators will have to meet and master. There is every reason to expect that these problems will be solved, and that twentieth century science will do much to make Palestine, for Jew and Arab alike, once more a land of milk and honey.

Science News Letter, March 20, 1948

CHEMISTRY

Fuel from Natural Gas

➤ GARDEN CITY, KANS., will soon become a gasoline-producing center. This motor fuel and other petroleum products are to be manufactured there from natural gas, from the neighboring Hugoton Field, which is not desirable for ordinary uses because of its low heating qualities.

The manufacturing plant is to be built by Stanolind Oil and Gas Company of Tulsa, Okla. It is a multi-million-dollar project. It will include a plant to extract liquefiable hydrocarbons such as gasoline, butane and propane from the natural gas; a synthesis plant including an oxygen-production unit; a chemical refining unit; laboratories and other buildings. The gasoline and fuel oils produced will be marketed largely in the Kansas area. The chemicals produced will be distributed nationally by U. S. Chemicals, Inc.

The huge Hugoton Field of southwestern Kansas is claimed to be the largest gas field in the United States and to contain 23,000,000,000 cubic

feet of gas, part of which has low heating qualities. The new plant will process about 100,000,000 cubic feet of this gas daily, it is expected.

In the process, dry feed gas from the field is burned under 300 pounds pressure with relatively pure oxygen to yield synthesis gas from which the final products are made. This synthesis gas is largely carbon monoxide and hydrogen. With the help of an iron catalyst in a fluidized state, being finely powdered, it is converted into the petroleum hydrocarbons and water.

Another plant for making gasoline and other hydrocarbons from natural gas is under construction in Texas. It will use gas of real fuel value, it is understood, not the low-heating-value gas to be used in Kansas. The supply of natural gas in America is limited, of course, but there is enough to permit the manufacture of liquid fuels from it for the next 25 years without danger to the amount needed for gas lighting and heating.

Science News Letter, March 20, 1948

CHEMISTRY

Convert Waste into Fuel

➤ THOSE great heaps of waste anthracite silt near hard coal mines may soon be furnishing homes with fuel gas and automobile engines with liquid fuel, President Frank W. Earnest, Jr., of the Anthracite Institute, Wilkes-Barre, Pa., revealed.

A new process for converting the present waste into fuel will be tested in a pilot plant under construction by the Institute's research organization of which Dr. Raymond C. Johnson is in

charge. In the anthracite country there are an estimated 200,000,000 tons of this silt immediately available, and more is produced every year.

Anthracite silt, washed out of the coal after mining, is about as fine as granulated sugar. It is not suitable for burning in grates and has accumulated at mine heads for years. Its use to produce fuel gas and liquid fuels will in no way decrease the available supply of marketable coal.

Do You Know?

Rats average 10 young to a litter, and may have up to 12 litters a year.

The *pearling* industry in Australia is expanding to meet American demands.

What is called the High C variety of *tomatoes* has at least twice as much vitamin C as the standard varieties.

There are nearly 192,000 railroad *bridges* in the United States; the sum of their lengths is about 4,000 miles.

Sugar is primarily a food, but it is used in hair tonics, shoe polishes, adhesives, photographic materials and explosives.

Sugar cane is a tall perennial grass; its stalk is divided into sections by joints, and each section contains a bud which will sprout when planted.

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Anthracite silt is an excellent fuel for the production of these gases, Dr. Johnson states, because it is non-caking, non-caking, free of tar, has a low sulfur content and a high ash-fusion temperature. The new process is related to the German method for gasifying brown coal. In it, the anthracite silt can be processed into three gases, two of which are fuel gases.

In the process, anthracite silt, air and steam are fed into a refractory-lined cylinder. Combustion takes place with the silt boiling inside the cylinder while the heavier ash settles to the bottom and is ejected by a rotary grate. The gas obtained is fed through a second bed of burning silt, fortifying it with addi-

tional carbon monoxide. The result is producer gas.

If gas of higher heat quality is desired, steam is forced into the burning silt in the second stage of the process. To produce gases from which liquid fuel is made, the same method of fluidized or boiling combustion bed is used. However, by intermittently blowing air and steam into the combustion chamber, or by using a continuous blast of oxygen and steam, a synthesis gas of carbon monoxide and hydrogen is produced. It is from these the liquid fuel is made as is done in making liquid fuels from natural gas or other coal.

Science News Letter, March 20, 1948

MEDICINE

Anti-Leukemia Weapon

➤ ARSENIC made radioactive in the atomic pile is now being tried in the treatment of leukemia and Hodgkin's disease, a group of University of Chicago and Argonne National Laboratory scientists reported at the meeting in Atlantic City of the American Association for Cancer Research.

The scientists are Drs. William Neal, Leon O. Jacobson, Austin M. Brues, Howard Ducoff, Robert Straube and Thomas Kelly.

"Very nice responses" have been obtained in some of the 12 patients treated so far. But, Dr. Jacobson cautioned, he does not know how long the improvement will last or even whether the present improvement is any better than the temporary responses obtained with other kinds of radiation treatment.

Use of the radioactive arsenic was started about nine months ago. It is being tried in the hope of obtaining both the chemical effect of ordinary, stable arsenic and the radiation effect of the radioactive chemical. Arsenic, as phy-

sicians know, has been used for treatment of leukemia and allied conditions since 1878.

The radioactive arsenic was first used in tracer studies on both laboratory animals and humans. These studies showed that the chemical was quickly and widely distributed throughout the body, which meant that its penetrating rays would get to the parts of the body where they were needed. The tracer studies also showed that the chemical is rapidly excreted, so there would be no danger from over-long irradiation.

Additional safeguard in the use of radioactive arsenic is the existence of BAL, or British Anti-Lewisite. This chemical can remove radioactive arsenic from the body as quickly as it removes the stable form of arsenic.

The radioactive arsenic used is arsenic⁷⁶. It has a short half-life, 25 hours, and must be used pretty rapidly after it comes from the atomic pile. It is made by pile irradiation of cacodylic acid, an arsenic-containing compound.

Science News Letter, March 20, 1948

MEDICINE

Breast Cancer in Mice

➤ A CANCER experiment which brought results exactly the opposite of the ones the scientists expected was reported by B. E. Bennison of the National Cancer Institute at the meeting in Atlantic City of the American Association for Cancer Research.

The experiments concerned the breast cancer in mice which is transmitted through some agent in the mouse

mothers' milk. The agent is thought to be a virus. Since the spleen helps in resistance to ordinary infections, Dr. Bennison removed the spleens from young mice who had been nursed by mothers carrying the cancer-causing agent in their milk. He expected the young mice to develop cancers at an earlier age than these usually appear.

Instead, it took longer for the cancers

to appear, and fewer mice developed cancer than was expected from what happened to their litter mates that did not have their spleens removed.

Possible explanations are: 1. The cancer-causing virus localizes in the spleen and when this is removed most of the virus is also removed. Or, 2, the spleen is

necessary for the multiplication of the virus.

Dr. Bennison cautions against hoping for any application of this technique to human cancers, and points out that removal of the spleen in mice has no effect on the cancer if done after the malignant growth has developed.

Science News Letter, March 20, 1948

PSYCHOLOGY

Quick As Wink Is Slow

Blinkers have a complete blackout of vision for a good three-tenths of a second, measurements by a British scientist indicate.

► HOW quick is a wink?

It is altogether too slow to be ignored by scientists, Dr. Robert W. Lawson of the University of Sheffield, England, concludes after careful measurements.

There is a complete blackout of vision, he figures, for a good three-tenths of a second. And since the winks, or blinks, are repeated at frequent intervals, you have been missing more than you probably realized.

Dr. Lawson divides blinkers into four main types. You probably belong to what he calls the J-type, since it is the most common among normal people. Men in the J-type blink every 2.8 seconds. Girls are slower. But still the inter-blink period is only a little less than four seconds. The other three groups—the plateau type, the bimodal type and symmetrical—have a longer period between blinks but are much less common.

This means that the majority of persons have their vision blacked out completely 11% of the time and have their vision at least partly blacked out about 20% of the time.

A current of air blowing into the eye increases the rate of blinking. So does the smoke from a cigarette between the lips; a bright flash of light; or a particle of dust in the eye.

Some individuals were found by Dr. Lawson to have a much more rapid blinking rate than others. This is important not only to the motorist but also in industry and in some sports. But it is of special importance in making certain kinds of scientific observations.

"In fast games like tennis or badminton," Dr. Lawson said in reporting his study to the scientific journal, *Nature* (Jan. 31), "the ball or the shuttlecock will certainly be lost to sight during the 0.3 second of the blackout due to blinking.

"For people with a high rate of blinking, bowls is a much more suitable form of recreation.

"In flying, too, the airman does not appear to have been aware hitherto of the effect of blinking on his efficiency, either in bombing a target or in fighter combat, for in the period of his blackout or mobile vision he may have travelled a distance of the order of 100 yards. The effect will be greater still for the pilot of a jet fighter."

Blinking is also important for the photographer. Dr. Lawson estimates that in taking a photograph of a group of 18 persons you might expect to find that two have closed eyes.

Science News Letter, March 20, 1948

sible hazards. They have been thoroughly tested by the U. S. Civil Aeronautics Administration and bear the full seal of government approval.

The grounding of these luxury liners, by voluntary action of the Douglas Aircraft Company and the five transportation systems using them, followed a safe landing of one afire in New Mexico just after a fatal crash of another in Utah. An official investigation by the Civil Aeronautics Board indicated that in both these cases gasoline which had overflowed while being transferred from alternate to main tanks in flight had entered a cabin heater air intake scoop under the fuselage.

All DC-6's resuming service have had their air intake scoops relocated in the leading edge of the wing, while the overflow vents have been conducted to the wing's trailing edge. Other changes include the replacement of aluminum air ducts in the heater compartment with stainless steel ducts, the addition of extra fire-extinguishing equipment, an increase in the number of smoke detectors, and the placing of loose-running electric wiring in conduits.

The Douglas DC-6 is described as America's first postwar air transport. The White House plane is one of this type. It is a 56-passenger craft, powered by four Pratt and Whitney engines with a total of 8,400 horsepower, and with Hamilton full-feathering, reversible-pitch propellers, which can be used to decrease the speed of the plane rapidly in landing. The craft is designed to operate most efficiently at a 15,000-foot altitude, and it has a cruising speed of 300 miles an hour. Its speed is assisted by a jet thrust exhaust system.

Science News Letter, March 20, 1948

MEDICINE

Markle Foundation Picks Group of Medical Scholars

► SIXTEEN scholars in medicine, who will teach and do research in American and Canadian medical schools for the next five years, were announced by the John and Mary R. Markle Foundation, of New York.

These scholars are the first group in a new program which provides \$25,000, payable at a rate of \$5,000 annually for the five years, from the Foundation. Twin aims of the grants are to relieve the acute shortage of teachers in medical schools and to encourage trained investigators in medical science.

Science News Letter, March 20, 1948

AERONAUTICS

Return DC-6's to Service

► NO MAJOR structural problems were involved in reconditioning for service the giant DC-6 transports, 97 of which were voluntarily grounded last November. Important modifications, recommended after intensive study, have now been made and all will be in the air

soon, it is officially reported.

Some of these planes returned to service on March 15, American Airlines announced. United, Panagra, National and Braniff transports of this type will all be in use this spring. The changes made are designed to remove any pos-



Ready for Spring

➤ **SPRING**, in the fancies of most modern poets, advances from the south, bringing buds and blossoms as she comes. It would be more accurate, and at least as pretty a picture, and possess the virtue of novelty besides, if spring were pictured as coming up from underground. Greek mythology realized this well, in the story of Persephone, but later poets seem largely to have overlooked the latent possibilities of beauty in the idea, like the flowers hidden in underground buds.

For it is true that practically all the flowers you are going to see in woods and fields this spring are already there. They were made last year and packed securely away in buds, to await the coming of the next blossom-time. Some of these buds are merely tucked away among the bases of last year's stems, as in violets, bloodroots and hepaticas. Others are more deeply embedded in bulbs or corms, as in fawn-lily, trillium and jack-in-the-pulpit. Some are even high up, on branches freely exposed to the full fury of winter gales; this is the case with all flowering shrubs, trees and woody vines.

These prefabricated flowers have to be protected during the winter not only against cold but against the cruel drying effects of the cold winds, that rob them of water while the plants' roots and stems are unable to bring up new supplies from the frozen soil. Hence the stout scales that cover tree and shrub buds, with their added protection of waxy or varnish-like coatings, or sometimes thick little pelts of plant hairs. Buds hidden under ground do not need this kind of protection and above-ground buds close to the surface usually receive at least partial protection from

snow and dead leaves, so they are as a rule less elaborately armored.

All such flowers-in-waiting receive the greater part of their protection against freezing not through any means for keeping warm, but through sap so much concentrated and thickened that it cannot form the ice crystals that would wreck the cell walls through their expansion. The sap of wintering plants is more like mucilage or syrup than it is like the watery fluid that runs

from tapped maple-trees and cut grapevines when the weather grows warm.

Thus the tight-folded, snug-packed flowers wait, concentrated in both form and fluid contents. When moisture becomes more abundantly available again they are ready to use it freely, both in expansion of what is already there and in rapid growth of new parts. The natural recipe for spring flowers is almost as simple as "Add water and serve."

Science News Letter, March 20, 1948

ARCHAEOLOGY

America's Culture Ancient

Renaissance in Central America was a century or two earlier than in Europe. Mayan learning was revived in twelfth century by the Toltec, Quetzal-coatl.

➤ **A REBIRTH** of learning took place in Central America a century or two before the Renaissance in Europe, Dr. Herbert J. Spinden of the Brooklyn Museum reported.

Most of the old Maya science with its highly developed astronomy and accurate calendar, in little use since the sixth century, A. D., was revived in the twelfth century under the Toltec man-deity, Quetzal-coatl.

The realization that the American continent has a culture fully as ancient as that of Europe and that an advanced civilization was developed here independently offers new hope of uniting the peoples inheriting this tradition, Dr. Spinden pointed out. All the Americas, North, South and Central, have in common the tradition of the Indian.

Nacxita Quetzal-coatl, who introduced the "plumed serpent" motif that distinguishes Toltec agricultural design, had a deep knowledge of Maya learning, Dr. Spinden stated. This is especially true in relation to the length of the tropical year and the appearance of the planet Venus as an evening and morning star. Details of his monuments show this deep understanding of the earlier civilization, also testified to by the orientation of his temples, especially the House of the Magician at Uxmal in Yucatan.

Quetzal-coatl, the Toltec emperor whose kingdom was the greatest in the New World, developed an abbreviated calendar based on the one used by the Mayas. To be accurately used for setting archaeological dates, however, it must be employed along with the more

detailed Mayan calendar. It was almost over-simplified.

It is these two calendars that make it possible accurately to date archaeological discoveries in Central America back to the time of Christ and even before. Such astronomical events as solar eclipses and phenomena of the nearer planets check to show that the dates are accurate.

Returning to Uxmal last April, Dr. Spinden found that the House of the Magician, covered with many signs and symbols of Quetzal-coatl, had been repaired to make it a safer tourist site. In the course of this work, one of the inner walls had been breached and a hitherto unknown temple exposed. The workmen probably did not realize the importance of the inner temple they entered, Dr. Spinden said. This was probably the original used by Quetzal-coatl for his astronomical observations. Several other temples in honor of this hero-god had been super-imposed upon it.

The inner temple is oriented so that its axis is only three minutes of an arc different from the famous base line at Copan, made by the Maya fully six centuries previously, Dr. Spinden's recent observations indicate. Such exact construction shows that the man who was made a god eight days after his death had thoroughly understood how the ancient Maya oriented their buildings so that each year the tropical year could be noted by observing points of sunrise and sunset. This gave them a year dial to measure time more accurately than our calendar in use today.

Science News Letter, March 20, 1948

Books of the Week

TO SERVE YOU: To get books, send us a check or money order to cover retail price. Address Book Dept., SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C. In the case of free publications order direct from issuing organizations.

AMERICAN WOOL HANDBOOK: A Practical Text and Reference Book for the Entire Wool Industry—Werner Von Bergen and Herbert R. Mauersberger—*Textile Book Publishers*, 2d ed., 1055 p., illus., \$8.00. Including history of the industry, technical information and an ample bibliography.

BIRDS OF PREY OF NORTHEASTERN NORTH AMERICA—Leon Augustus Hausman—*Rutgers University Press*, 164 p., illus., \$3.75. A beautiful book for bird students and bird watchers.

CHEMISTRY: A Course for High Schools—John C. Hogg, Otis E. Alley and Charles L. Bickel—*Van Nostrand*, 2d ed., 555 p., illus., \$2.88. The chapter on atomic structure and atomic energy is completely rewritten.

THE CHILD IS RIGHT: A Challenge to Parents and Other Adults—James Hemming and Josephine Balls—*Longmans, Green*, 176 p., illus., \$2.25. Written about British children but useful and interesting for American parents as well.

COMMUNICABLE DISEASES FOR NURSES—Albert G. Bower and Edith B. Pilant—*Saunders*, 6th ed., 657 p., illus., \$4.00.

THE CULTIVATED SPECIES OF PRIMULA—Walter C. Blasdale—*University of California Press*, 284 p., illus., \$7.50. A book for flower lovers as well as botanists.

DETOXICATION MECHANISMS: The Metabolism of Drugs and Allied Organic Compounds—R. Tecwyn Williams—*Wiley*, 288 p., \$5.50. An account of the chemical changes that foreign organic compounds undergo in the animal body. Intended not only for specialists but also for students, research men and others.

THE ESSENTIALS OF PLANT BIOLOGY—Frank D. Kern—*Harper*, 440 p., illus., \$4.00. An account of how life—individual and racial—is maintained in plants upon which mankind is so dependent. A text in elementary botany which is very readable for the general reader.

GOOD HEALTH IS GOOD BUSINESS—Joint Subcommittee on Health of the NPA Agriculture, Business and Labor Committees—*National Planning Association*, 44 p., paper, 25 cents.

INDUSTRIAL WEIGHING—Douglas M. Conside—*Reinhold*, 553 p., illus., \$10.00. On the design, construction and operation of scales and intended especially for the users of these important instruments.

MARRIAGE COUNSELING PRACTICE—John F. Cuber—*Appleton*, 175 p., \$2.25. A non-technical book intended to be useful alike to counselor and to client. The limitations of marriage counseling service as well as recommended practice are discussed.

NATURE OF LIFE: A Study on Muscle—A. Szent-Gyorgyi—*Academic Press*, 91 p., 7 pl., \$3.00. A series of lectures written in the United States for the University of Birmingham and the Massachusetts Institute of Technology.

PACIFIC DISCOVERY, Vol. 1, No. 1—Don

Greame Kelley, Ed.—*California Academy of Sciences*, 32 p., illus., bi-monthly, single copies 50 cents, \$3.00 a year. Containing beautifully illustrated articles by intellectual adventurers in many scientific fields. Order subscriptions from the California Academy, 2057 Center St., Berkeley 4, Calif.

REPORT OF THE COMMISSION ON TECHNICAL NEEDS IN PRESS, RADIO, FILM FOLLOWING THE SURVEY IN TWELVE WAR DEVASTATED COUNTRIES—*United Nations Educational, Scientific and Cultural Organization*, 189 p., paper, \$1.20 plus postage direct from UNESCO, 19, Avenue Kleber, Paris—16, France.

THE RUFFED GROUSE: No. 2, 1948—*Audubon Society of Western Pennsylvania*, 60 p., illus., paper, \$1.00. The second issue of a publication which first appeared in 1944, containing interesting articles not all confined to ornithology.

SAFETY FOR THE HOUSEHOLD—National Bureau of Standards—*Govt. Printing Office*, 190 p., illus., paper, 75 cents. Covering all sorts of hazards in the home from leaking refrigerator gas to loose button eyes on toy animals.

TECHNIQUE OF MICROWAVE MEASUREMENT—Carol G. Montgomery, Ed.—*McGraw-Hill*, 939 p., illus., \$10.00. The collective result of work done in many laboratories during the war by thousands of researchers as background to the development of radar.

THEORY AND APPLICATION OF MICROWAVES—Arthur B. Bronwell and Robert E. Beam—*McGraw-Hill*, 470 p., illus., \$6.00. Especially for engineers.

WELDING HELPS FOR FARMERS—James F. Lincoln Arc Welding Foundation, 431 p., illus., \$1.00.

YOUTH IN DESPAIR—Ralph S. Banay—*Coward-McCann*, 239 p., \$3.00. About juvenile delinquency.

Science News Letter, March 20, 1948

ENGINEERING

Sun-caused "Snowstorm" Discovered on Television

➤ SNOWSTORMS caused by the sun are the latest difficulty encountered in television.

The "snowstorms" are a type of visual interference well known to owners of television sets. This streaking, resembling a violent snowstorm, is usually blamed on auto ignition interference.

Now, British Broadcasting Corporation engineers believe they have found a particularly violent television snowstorm caused by radio waves from the sun.

The sun-caused snowstorm was discovered last August, E. C. Drewe and D.

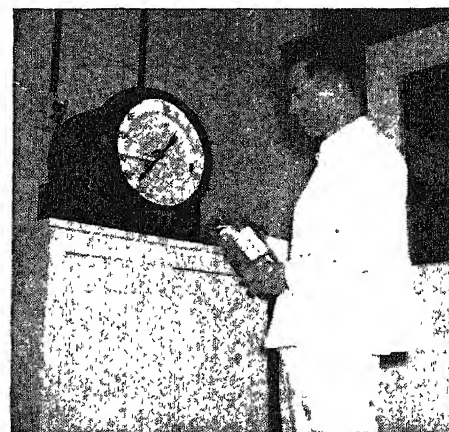
Maurice of the BBC research department have reported to the British journal, *Nature* (Jan. 31). It was all over in a minute, but the violent interference with a television broadcast was so impressive that the engineers set out to find the cause. The nature of the disturbance made them suspect the sun. A check with records of solar noises verified their suspicion.

Science News Letter, March 20, 1948

Science Service Radio

➤ LISTEN in to the 18th anniversary of "Adventures in Science" over Columbia Broadcasting System at 3:15 p.m. EST Saturday, March 27. Dr. Warren Thompson, director of Scripps Institution for Population Research, will be the guest of Watson Davis, director of Science Service. Dr. Thompson, who launched the program in 1930, will discuss new aspects of the same talk he gave then—Our Future Population.

Science News Letter, March 20, 1948



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⚙️ **LIQUID-BAIT** rat trap uses water as a lure because rats are often thirsty and said to be less wary of water than of food-bait. Its one-piece base has a water-holding depression. The trap, made of rust-proof metal, can be sterilized in boiling water or flame after each use.

Science News Letter, March 20, 1948

⚙️ **Rocking razor**, a non-electric device made in England, makes it possible to take a dry shave at any time in any place. Its two blades working inside a perforated guard, cut the beard by a scissors movement. Rocking the razor gently, with its curved guard against the face, operates the blades.

Science News Letter, March 20, 1948

⚙️ **HANDY ARC TORCH** for use in alternating current welding has two copper coated carbon electrodes clamped in aluminum alloy jaws. A simple thumb control on the plastic handle of the torch permits easy adjustment of the distance between the points of the carbons.

Science News Letter, March 20, 1948

⚙️ **AIR-CONDITIONING** unit for a railroad passenger car has its own alternating current power plant and is completely independent of the locomotive. The unit provides heated or cooled air as needed, also cooled drinking water and energy for flicker-free fluorescent lighting.

Science News Letter, March 20, 1948



⚙️ **AERIAL FRAME** viewer on a new type camera permits the photographer to use both eyes, one looking through the focusing window, the other with unobstructed view as shown in the picture. Focusing through the rangefinder is first made with one eye; then both are used to keep the picture framed and observe the subject's actions at the same time.

Science News Letter, March 20, 1948

⚙️ **ILLUMINATED WALKING** stick, recently patented, has a shaft which is a translucent tube to which is attached a solid tip and upper part. A tiny electric lamp, flashlight type, placed at the bot-

tom of the translucent section, provides the illumination.

Science News Letter, March 20, 1948

⚙️ **PRUNING TOOL**, powered by compressed air, makes the trimming of lawn trees and shrubbery easy. The cutter itself, on the end of an extension rod, is operated by air released by a trigger on the handle. An eight-cubic-foot compressor, powered by a 1 3/4 horsepower motor, operates the device.

Science News Letter, March 20, 1948

Your unique chance to grow NEW flowers your neighbors won't have this spring

Only a few novel flowers are introduced to the nation's gardens—but THINGS of science has secured for its members packets of seed of three of the most outstanding kinds!

RADIANCE COSMOS—Seed of first bicolor cosmos variety ever developed, giant flowers are deep rose with crimson centers. Top winner in 1948 All-American Selection trials.

LUTHER BURBANK ZINNIAS—Seed of new pastel shaded zinnia variety, blossoms are five inches in diameter.

CUTHBERTSON SWEET PEAS—Seed of a new type with stronger vine growth and longer stems; resistant to summer heat.

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Things of science

Membership is strictly limited to 10,000 and will be for at least the next nine months. This is America's most unique "club."

Question Box

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BIOCHEMISTRY

What explanation has been given for overweight in diabetes? p. 178.

CHEMISTRY

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MEDICINE

Against what diseases may polymyxin prove effective? p. 179.

How can recovery from apoplexy be speeded? p. 173.

How may the discovery that an anti-vitamin interferes with hormone activity affect cancer treatment? p. 182.

What is the new test for detecting unsuspected cancer? p. 180.

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How do sex differences affect the skin's color? p. 182.

PSYCHOLOGY

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Photographs: Cover, p. 181, U. of California; p. 178, Navy; p. 183, Boeing Aircraft Co.

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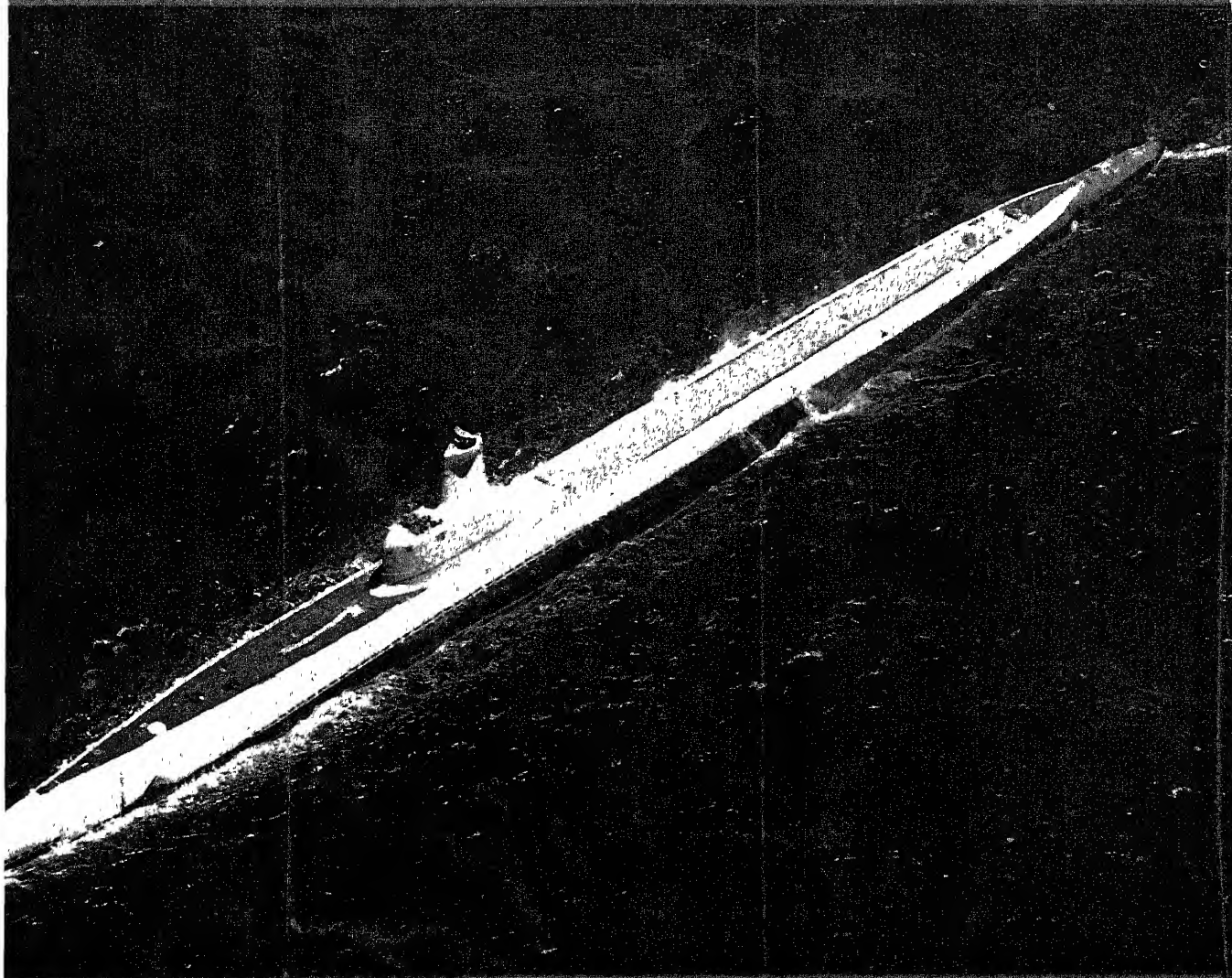
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Submarine New Look

See Page 200

A SCIENCE SERVICE PUBLICATION



RCA scientists—pioneers in radio-electronics—apply the “radio tube” to communications, science, industry, entertainment, and transportation.

This “magic lamp” makes Aladdin’s look lazy

You will remember the fabulous lamp—and how it served its master, Aladdin. Serving you, today, is a real “magic lamp”... the electron tube.

You are familiar with these tubes in your radio, Victrola radio-phonograph or television set... but that is only a small part of the work they do. Using radio tubes, RCA Laboratories have helped to develop many new servants for man.

A **partial** list includes: all-electronic television, FM radio, portable radios,

the electron microscope, radio-heat, radar, Shoran, Teleran, and countless special “tools” for science, communications and commerce.

The electron microscope, helping in the fight against disease, magnifies bacteria more than 100,000 diameters, radar sees through fog and darkness, all-electronic television shows events taking place at a distance, radio-heat “glues” wood or plastics, Shoran locates points on the earth’s surface with unbelievable accuracy, Teleran adds to the safety of air travel.

Constant advances in radio-electronics are a major objective at RCA Laboratories. Fully developed, these progressive developments are part of the instruments bearing the name RCA, or RCA Victor.

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RADIO CORPORATION of AMERICA

GENERAL SCIENCE

Keep Scientists on Job

If universal military training is begun, our technical manpower would render best national service by being assigned to work at research projects.

By WATSON DAVIS

➤ SCIENCE and technology will be mobilized along with men, materials and money in meeting the new world emergency now before the nation.

If selective service is put into effect again and universal military training is begun, careful planning will be necessary in order that some of the mistakes of the use of technical manpower in the last war are not made again.

Less regard was given in the United States to putting the scientist and engineer into the best place for national service than in most warring nations. Even some of the key research laboratories, such as those producing the atomic bomb, had to argue long and painfully with draft boards to prevent their essential draft-age men from being pressed into shooting services.

Full-scale researches on jet propulsion, atomic bombs, biological or germ warfare, and scores of other direct military developments are underway on a relatively large scale with Army, Navy and Air Force funds.

Military Funds for Research

More fundamental researches in all fields of science and technology—ranging from the sun to the brain—are similarly supported by military funds on a long-range basis.

These military expenditures for science and technology are coordinated by a Research and Development Board, headed by Dr. Vannevar Bush who directed the famous OSRD in the last war.

There will be an immediate demand if the draft is re-enacted to keep the scientists working on these projects at their research jobs, regardless of their age.

Scientists and military officials alike are expected to recommend that clear-cut Congressional authority be given selective service to keep the scientists at the jobs they and only they can do, regardless of decisions by local draft boards. In doing this America would adopt a principle that worked well in almost every other nation during the war, Soviet Russia included.

Universal military training presents a more difficult and critical problem from the standpoint of supply of technical manpower. During the last war, thousands of scientists of the future were lost because they were drafted and not allowed to undertake basic training in college that would lead to research careers. Many educators and scientists are opposed to universal military training in fear that it would remove the potential scientists from their training at the most critical time.

Nurturing Science Ability

People possessing rare science ability must be allowed to develop and use it. That is the argument. Wasting scientific ability would be just as unwise as using precious uranium for coloring glass instead of making atomic bombs. Demands will therefore be made in UMT discussions to protect by Congressional action the intelligent use of potential scientific manpower.

The passage of the National Science Foundation bill soon to be reintroduced

into Congress as a bipartisan measure may be speeded by the present emergency. Further delay in the establishment of a fundamental national science program would be illogical in the face of increased demands upon science both by the military needs and the nations to be helped by ERP.

Prompt establishment of a science foundation combined with the military research program underway would probably obviate the organization of a temporary research effort such as OSRD conducted during the war.

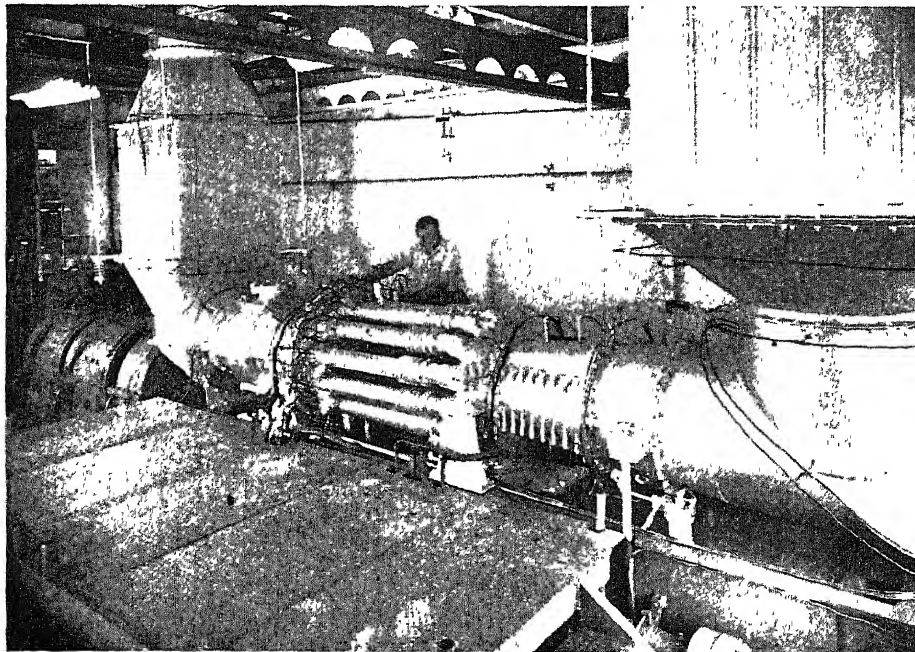
In giving aid to the 16 European nations under ERP, technical information will play a large part. One of the provisions specifically spelled out in the bill as passed by the Senate is the "procurement and furnishing of technical information and assistance."

Science News Letter, March 27, 1948

ENGINEERING

Adapt Jet Plane Research To Turbine Locomotives

➤ A MAINLINE railroad locomotive powered with a gas turbine electric drive, under construction in Pittsburgh by Westinghouse Electric Corporation, will make use of much of the knowledge gained in building jet propulsion engines for high-speed airplanes, the company revealed.



REVOLUTIONARY LOCOMOTIVE—Shown here tested under simulated railroad operating conditions is the heart of a possible "iron horse" of the future being powered with a 2,000-horsepower gas turbine.

The axial-flow compressor, heart of Westinghouse jet engines, also is being adapted to other uses than in aircraft. A 2,000-horse-power gas-turbine, suitable for locomotive or industrial use, has demonstrated the soundness of its engineering design in more than a thousand hours of testing. On the basis of these tests, the company is proceeding to build two similar gas turbines for use in a locomotive designed to compete with diesels in both traction and industrial service.

In the gas turbine, fuel such as oil, gasoline or kerosene is sprayed into compressed air in a combustion chamber. The resultant hot gases expand tremendously against rows of curved blades which spin the turbine drive shaft. For locomotives, the turbine would generate electricity for application to driving motors. An axial-flow jet engine is one in which the air scooped in for combustion sweeps in a straight line from intake to exhaust.

Science News Letter, March 27, 1948

BIOCHEMISTRY

Find Anti-Insulin Enzyme

Insulinase, as this chemical is called, has been found to destroy insulin when mixed with it. May have important bearing on diabetes.

➤ **DISCOVERY** of an anti-insulin chemical in the body which may have an important bearing on diabetes was announced by Drs. R. H. Broh-Kahn and I. Arthur Mirsky of the May Institute for Medical Research of the Jewish Hospital, Cincinnati, at the Atlantic City meeting of the Federation of American Societies for Experimental Biology.

Insulinase is the name they have given this chemical. It is an enzyme which rapidly destroys insulin when mixed with it. It has been found in various tissues of the body. Liver, an organ whose function is markedly impaired in the absence of insulin, is especially rich in the anti-insulin enzyme.

Since the chemical rapidly destroys insulin, it might be responsible for

causing diabetes. An increase in the amount of insulinase in body tissues or an increase in its activity might destroy insulin being made in the body before insulin had a chance to perform its function of regulating sugar utilization. But, the scientists emphasized, their studies have not gone far enough for them to express an opinion on this point.

Meanwhile, possibility of helping diabetic patients in the future appears from one aspect of their work. The activity of the anti-insulin chemical, they found, can be lowered or destroyed by certain chemicals, among them copper and zinc salts. If further studies with animals show that this can be applied to man, it might lead to a decrease in the amount of insulin diabetics would need to take.

Science News Letter, March 27, 1948

MEDICINE

Stop Bleeding in Patients

➤ A FEW patients who might have bled to death because of an obscure disease are alive today, thanks to discoveries by a young University of Chicago surgeon.

Modestly and with true scientific caution, the surgeon, Dr. J. Garrott Allen, refuses to claim that he has saved any lives. But his colleagues at the university say he has. And the American Society for Pharmacology and Experimental Therapeutics at its meeting in Atlantic City awarded him its top honor, the John J. Abel \$1000 prize donated by Eli Lilly and Company.

"Lasting benefit" has come to some patients treated by the method Dr. Allen

discovered, the prize award announcement states.

These patients suffered from a bleeding disease that resembles but is not the same as hemophilia, the hereditary bleeding disease once known as the "curse of the Hapsburgs."

Atomic medical research, done for the Manhattan Project and the Atomic Energy Commission led to the discovery of how to control this bleeding.

Future victims of acute leukemia, as well as any potential victims of future atom bomb attacks may be helped by the discovery.

Bleeding is a troublesome feature of

acute leukemia that has obscured the true picture of what is wrong in this disease. Bleeding killed many atomic bomb victims who survived the blast effects of the bombing in Japan. Bleeding is part of the radiation sickness that may come in patients getting X-ray treatments. It is a threat limiting the usefulness of these treatments and the nitrogen mustard for leukemia patients.

This bleeding, Dr. Allen discovered in dogs who get big doses of X-rays, is due to release in the blood of an anti-clotting chemical. Previously, scientists thought the bleeding after X-rays was due to disturbance of the body's natural mechanism for making blood clot when it is shed.

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The bleeding can be controlled, temporarily at least, by two chemicals. One is a blue dye, toluidine blue. The other is a basic protein, protamine sulfate. The protein is also used to make slow-

action insulin for diabetics. The protein acts very quickly, stopping the bleeding in three to four minutes. The dye is slower but its effect lasts from three to five times longer.

Science News Letter, March 27, 1948

PHYSIOLOGY-ENGINEERING

Personal Air-Conditioning

Ventilated clothing was found to keep pilots comfortable and reduce the weight consumed by air-conditioning equipment for cabins on planes.

➤ VENTILATED clothing is likely to replace air-conditioned cabins in military aircraft of the future. Successful trials of the ventilated clothing were reported by Drs. E. S. Fetcher, S. I. Rapaport and John F. Hall, of the Aero Medical Laboratory, Wright Field, Ohio, at the meeting of the Federation of American Societies for Experimental Biology in Atlantic City.

Air Force pilots were kept comfortable by their ventilated clothing at temperatures ranging from 30 degrees below zero Fahrenheit to 180 degrees above.

The ventilation was accomplished by piping air through tubing to all parts of the body. The air was kept at temperatures between 50 and 110 degrees Fahrenheit. Coveralls of coated nylon kept it close to the skin. The air was forced through the coveralls at the rate of 55 cubic feet per minute. Regardless of the type of outer clothing worn, the pilots remained comfortable because this wall of air, insulated by the outer clothing, controlled their body temperatures.

Hands and feet were purposely left out of the "ventilating circuit" because previous research had shown that no artificial heating or cooling of them is necessary in the 30 below to 180 above zero temperature range. If the rest of the body is kept warm enough, the scientists explained, the blood passing through the hands and feet will keep them comfortable. Medium-weight gloves and heavy boots were all the men needed to keep their hands and feet warm when wearing their ventilated clothing.

Military personnel other than Air Force pilots, and industrial workers whose jobs subject them to very hot temperatures, might also benefit from the ventilated clothing, the scientists suggested, although so far it is still in the experimental stage.

For the Air Forces, the great saving

in weight now consumed by bulky air-conditioning equipment for cabins is an important advantage of the new clothing for personal air-conditioning.

Science News Letter, March 27, 1948

MEDICINE

Feeding Complete Meals By Vein May Be Possible

➤ COMPLETE feeding by vein instead of by mouth may be possible, preliminary studies reported at the meeting of the Federation of American Societies for Experimental Biology in Atlantic City by Drs. H. C. Meng and Smith Freeman of Northwestern University School of Medicine show. While few healthy persons would want to give up the fun of eating their food, very sick

persons often are unable to eat. Feeding them by vein is now widely practiced, but they do not get complete meals in this way. Sugar, salt, vitamins and protein building blocks are all they get.

The Northwestern scientists have gone a step farther and added butter fat to the meals by vein. Two dogs fed this way for eight and 10 weeks stayed healthy and kept their weight. A slight anemia developed but did not progress.

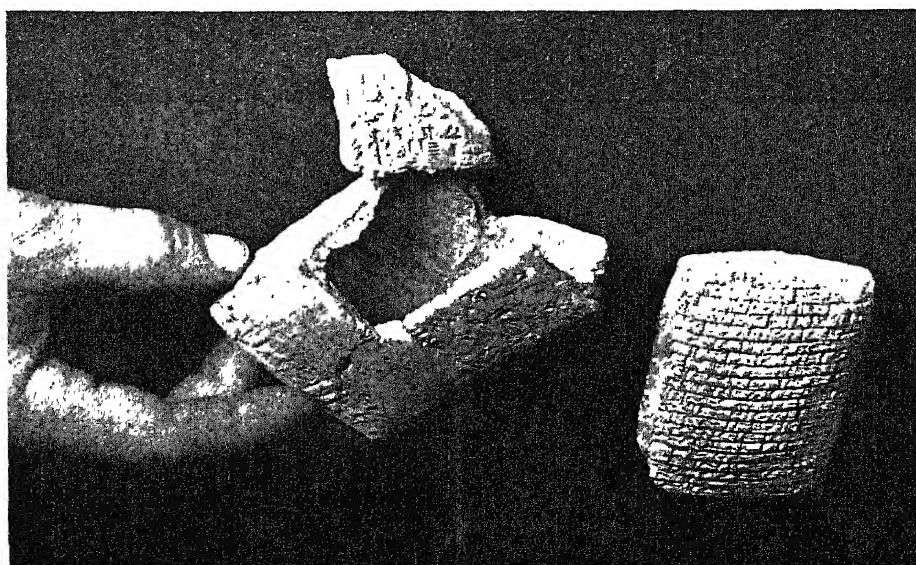
Science News Letter, March 27, 1948

PHYSIOLOGY

You Eat To Keep Warm, New Theory Suggests

➤ HOW much you eat is regulated, not by your stomach or the taste buds in your mouth, but by a tiny pea-sized area at the base of your brain, called the hypothalamus. And this brain area makes you eat more or less according to the temperature. This new theory, suggesting that the urge to eat is an urge to keep warm, was proposed by Dr. John R. Brobeck of Yale University, at the meeting of the Federation of American Societies for Experimental Biology in Atlantic City. The theory is based on research by himself and other scientists. In the latest studies they found that rats eat less and less as the temperature goes up, in an effort to keep from getting too hot.

Science News Letter, March 27, 1948



BABYLONIAN BRICKS—Baking these clay tablets, a new technique developed by Prof. Ferris J. Stephens of Yale University, makes their cuneiform inscriptions more legible. (See SNL, March 20.) Here is shown a clay tablet and the envelope from which it came. The terms of the agreement were imprinted on both so that any changes could easily be detected.

PHYSIOLOGY

Recording Track Running

➤ **MINIATURE** earthquakes made on the cinder track by the feet of runners sprinting for the finish line can be picked up by regular earthquake-detecting instruments, called seismometers, and recorded on portable electrocardiographs used by doctors to study heart action.

This new method of studying track running was announced by Drs. Peter V. Karpovich and Nathan Millman of Springfield, Mass., College at the meeting in Atlantic City of the Federation of American Societies for Experimental Biology.

The seismometers are placed along the track at 20-yard intervals. Direct measurements are made of the footprints left on lime sprinkled over the cinders. Time intervals are also recorded in tenths of a second.

Sprinters, the new method shows, take a longer and faster step with the right leg than with the left. This is because most people are right-handed and their left legs are stronger than their

right legs, the scientists explain. Left-handed people will show the reverse. But one left-handed man is an exception. He had developed the athletic habits of a right-handed man and therefore had his left leg stronger than his right.

During distance runs no difference in length of step was observed.

Science News Letter, March 27, 1948

Poor Diet Slows Reaction

➤ **AUTOMOBILE** drivers who do not step on the brakes fast enough in emergencies may owe their slow reaction time to poor diet. Short rations of the B vitamin called thiamin slowed the reaction time of a group of women at the State University of Iowa, Drs. W. W. Tuttle, Marjorie Wilson and Kate Daum of that institution reported. The tests were made on reaction time to a light stimulus, but presumably the findings apply generally and to men as well as women.

Science News Letter, March 27, 1948

PHYSIOLOGY

Human Ribs Found Weak

➤ **IF** you want to call that rib Adam lost in the Bible story a "weak sister", your pun won't be far wrong. All human ribs are relatively weak, Drs. Milton H. Joffe and F. A. Hitchcock of Ohio State University reported at the meeting of the Federation of American Societies for Experimental Biology in Atlantic City. It takes less than 20 pounds pressure to break a rib, they found.

The pressure required to break ribs was investigated in a study intended to gather facts about the strength of the human body for proper design of safety equipment. The study is said to be the first such ever made. The effects on the body of severe deceleration of aircraft is the primary objective of the study, but industrial workers as well as aviators will benefit from the findings.

The ribs are generally credited with providing protection for vital organs of the body against injury from crushing or body blows. But the major portion of the strength of the chest, Dr. Joffe now believes, comes not from the ribs alone but from the combination of these and the many muscles of chest and abdomen.

Ribs can absorb energy in the range of 10 to 100 inch pounds. But the chest can absorb energy up to 1000 foot pounds or more. Since all ribs show the same mineral content and structure, the studies show how much of the chest's strength comes from muscles.

Science News Letter, March 27, 1948

VETERINARY MEDICINE

Human Brucellosis Remedy Too Costly for Animals

➤ **FARMERS** and stockmen were warned against hoping to use a newly reported treatment for brucellosis, or undulant fever, to wipe out the disease in their cattle.

The treatment, consisting of a combination of the mold remedy, streptomycin, and a sulfa drug, has been successfully used to treat human brucellosis patients. But it would not be practical for use in treating cows, pigs or goats.

"Cost of the treatment is prohibitive from the standpoint of most farm budgets and therefore it would be warranted only for extremely valuable animals," Dr. J. G. Hardenberger, executive secre-

tary of the American Veterinary Medical Association, Chicago, stated.

"Moreover, there is no assurance that it would produce the same results as it does in human beings."

A program now widely used for controlling brucellosis in livestock involves blood-testing to detect the disease, vaccination to prevent it, and segregation and slaughter of infected animals.

About 2,000,000 cattle and "very large" numbers of swine in the United States have the disease. Sheep, goats, horses, dogs, cats, poultry and wildlife may also harbor the infection. Its principal effect on animals is to cause abortion. In humans, it produces fever, chills and dizziness that keep recurring. Humans get the disease by contact with infected animals or by consuming unpasteurized milk from diseased cattle and goats.

Science News Letter, March 27, 1948

PHYSIOLOGY

Dogs Can Digest Starches, Experiments Indicate

➤ **DOGS** can digest and assimilate starchy foods, despite widespread notions to the contrary. And bones, though doubtless fun for Fido, are not essential.

These apparent heresies are offered by research veterinarians on the staff of the Ralston Purina Company, which includes prepared dog foods in its list of products. Their experiments showed that dogs can digest foods made from wheat and other grains, as well as the oft-forbidden potato. Dogs even thrive on diets that include sugar.

The veterinarians call attention to the fact that the classic experiments establishing the function of insulin in controlling the blood sugar level were performed on dogs. This would not have been possible if the dogs were not physiologically adapted for a diet consisting in part of carbohydrates.

Although dogs like red meat just as humans do, it is not in itself adequate for their whole diet. Dogs kept on an all-red-meat regimen soon became seriously ill.

Dog owners are advised against trying to treat their pets as if they were human beings, accustomed to three meals a day—and eating too much at that. They should be fed things that dogs like rather than things people like, and owners not be too shocked if they show a perfectly natural preference for smelly tidbits out of the garbage-can.

Science News Letter, March 27, 1948

VETERINARY MEDICINE

Study Animal Virus Abroad

American scientists will set up study program in Europe to combat foot and mouth disease. Will visit England, Netherlands, Denmark and Switzerland.

➤ THREE U. S. Department of Agriculture veterinarians have sailed for England to set up a new arsenal in the war against foot and mouth disease which has been threatening to invade this country from Mexico.

The scientists, Drs. L. O. Mott, Howard W. Johnson and E. A. Eichhorn, will work at European foot and mouth disease laboratories. They are taking trunkloads of laboratory equipment to conduct experiments in cooperation with European scientists. Other groups from the Department of Agriculture will probably be selected soon for European work.

First stop for the scientists is Pirbright, England, about 30 miles west of London, where Britain has a research center for study of the disease which is threatening America's meat supply. The Department of Agriculture scientists will also visit foot and mouth disease laboratories in the Netherlands, Denmark and Switzerland.

Meanwhile, a U. S. center for research on the disease is in the real estate stage. Congress is considering legislation which would appropriate funds for an island station where experiments could be conducted with diseased animals without danger of spreading the dread virus. Agriculture officials are shopping around for the island.

The new "Alcatraz" for foot and mouth infected animals is expected to be on the East Coast. Several sites near Long Island have been investigated by officials who will decide on the location.

When the island laboratory is set up, scientists expect to concentrate on new and improved vaccines for combatting foot and mouth disease. The new station will be "roughly modeled" on a similar German research center, now in the hands of the Russians.

The German station is on the island of Riems, a couple of miles off the Baltic Coast of Germany near Greifswald. One of the world's foremost authorities on foot and mouth disease, Dr. Otto Waldmann, has directed work on this island for more than two decades. When the U. S. S. R. first occupied the island, which is near the famous rocket experiment station at Peenemunde, the foot and mouth disease laboratory was taken down and removed to Russia. Latest report is that the equipment has been returned to Riems, and that Dr. Waldmann is continuing to direct his work there.

The American scientists in Europe have no plans for visiting the German island, but some Department of Agriculture officials were there before World War II.

Science News Letter, March 27, 1948

to cause the snowflakes to melt immediately upon contact, leaving dark blue impressions of the crystals. Operating automatically, the instrument exposes the paper to the storm for one minute at 15-minute intervals. This is sufficient to record a storm's history.

Science News Letter, March 27, 1948

ASTRONOMY

Two Comets Discovered By European Astronomers

➤ POLITICAL events are not the only news from Czechoslovakia. Czech astronomers have discovered a new comet, it was reported by Harvard College Observatory, clearing house for astronomical findings.

The tenth-magnitude comet was spotted from the Skalnaté Pleso observatory in eastern Czechoslovakia. It is called comet Pajdusakova-Mrkos, in honor of the astronomers who made the discovery.

A brighter new comet, of the eighth magnitude and visible through small telescopes, has been reported from the Netherlands and named Comet Keus-kamp.

The new discoveries bring the number of new comets spotted thus far in 1948 to four.

Science News Letter, March 27, 1948

METEOROLOGY

Fingerprint Snow Crystals

➤ SNOWFLAKES falling on a special paper in a new automatic instrument leave a record of their size and shape, how densely together they fell and the number that landed in a given area.

This new snow crystal fingerprinting instrument has practical applications in weather studies. It makes it possible to count the snow crystals in a storm and thus provide information about the numbers of fine nuclei in the atmosphere. These are the fine particles of dust or other material which are necessary to keep a storm active.

Teamed with other devices, the instrument is now being used to help

determine how brightness of the sky and how the flow of electric current from the atmosphere to the ground are affected by a snowstorm.

The snowflake recorder is a development of General Electric, Schenectady, N. Y. The co-developers were Vincent J. Schaefer, the scientist who first made an artificial snowstorm by sprinkling powdered dry ice in a super-cooled cloud from an airplane, together with Raymond E. Falconer and William Kearsley.

The special paper used for recording is coated with water-soluble dye. A small amount of heat is applied to its under surface. This heat is just enough



SNOW CRYSTAL RECORDER—
This instrument, which prints on paper the geometric shape, size and frequency of occurrence of snow crystals falling in a storm, is shown being observed by one of the men who developed it—Raymond E. Falconer.

AERONAUTICS

New Navy Helicopter Has All-Metal Rotor Blades

➤ ALL-METAL rotor blades feature a new Navy helicopter just revealed. But nylon replaces metal in its fuel tanks, and a hatch in the floor permits the use of the craft in aerial photography.

This new experimental helicopter, built by Sikorsky Division, United Aircraft Corporation, Bridgeport, Conn., will be known as the XHJS-1 in the service. It has a maximum capacity of five persons, including the crew. It is specially designed for utility, rescue and observation work aboard aircraft carriers, battleships and cruisers.

It is a one-engine affair, and has a tail construction that makes it resemble the conventional airplane more than do other helicopters. Its tail rotor has been attached to an arm projecting upward at an angle from the tip of the tail cone. This raises the revolving blades above head level, making it safer for shipboard personnel, and will prevent the blades from striking the deck in landing in a heavy sea.

Science News Letter, March 27, 1948

ENGINEERING

"Yon Bonnie Banks" Are New Power Station Site

➤ IF ANY Americans are still suffering from sentimental qualms about TVA and the big dam construction projects planned for the Missouri River Valley, let them consider the plight of the Scots.

Loch Lomond, celebrated in the song dear to the hearts of many persons on both sides of the Atlantic, is to be involved in a new hydroelectric power development. London papers report that nearly \$200,000,000 will be spent on the project in the Scottish highlands.

Loch Sloy, a lake near Lomond, is being dammed. Water will be carried off in a two-mile tunnel through Ben Vorlich, a mountain.

And "On yon bonnie banks" will be the Sloy power station, on the west shore of Loch Lomond.

Science News Letter, March 27, 1948

WILDLIFE

American Biologists Are Surveying Cuban Birds

➤ AMERICAN biologists have begun a survey of the birds that winter in Cuba, the second Latin American country to request aid from this

country in studying its wildlife resources.

Three biologists of the U. S. Fish and Wildlife Service went to Cuba to make the bird survey. Although several Latin American countries have requested help in the development of their fishery resources, Director Albert M. Day of the Fish and Wildlife Service said that Guatemala is the only other country in South or Central America which has asked for U. S. assistance in a study of its wildlife resources.

The Cuban survey will help in planning future conservation programs to protect migratory birds all along their travels.

Frederick C. Lincoln, assistant to the director of the Fish and Wildlife Service, will head the group in Cuba. Other American scientists studying Cuban birds will be Allen J. Duvall and Thomas D. Burleigh, both of the Service's Division of Wildlife Research.

Science News Letter, March 27, 1948

FORESTRY

Preventing Floods Is Problem of the Land

➤ PREVENTING floods is a land job and not merely a water problem, Lyle F. Watts, chief of the U. S. Forest Service, declared.

The Department of Agriculture scientist discussed flood prevention as a guest of Watson Davis, director of Science Service, on Adventures in Science, heard over the Columbia network.

Floods result from "any upsetting of the natural balance between the soil and its ability to take in water, store it and control its run-off," Mr. Watts explained.

Causes of floods, as listed by the Forester, include:

Forest fires, excessive timber cutting, careless logging practice, over-grazing, and other abuses of land.

The forest and woodland areas, pastures and croplands at the headwaters of streams are where the flood problem begins, he said.

"What happens to a watershed," Mr. Watts declared, "is very often determined by who owns it."

He advocated public ownership of key watershed areas, citing Akron, Ohio, and Asheville, N. C., as cities that have bought up areas furnishing their water supplies.

But in most instances, watersheds involving flood hazards are under private ownership, the scientist reported.

Science News Letter, March 27, 1948

IN SCIENCE

ENGINEERING

Underwater Speed Greater In Streamlined Submarines

See Front Cover

➤ NAVY submarines are getting that new streamlined look. Called the "Guppy" program, the alterations involve streamlining the hulls of the fleet submarines by reducing the size of their superstructure and by removing deck guns and other topside appendages to cut down under-water resistance and increase their submerged speed, as shown on the cover of this week's SCIENCE NEWS LETTER.

These alterations are based upon research conducted by the Navy during and after World War II and on German U-boat developments. Several submarines have already been altered under this program and their trials are now being conducted in both Atlantic and Pacific waters.

Science News Letter, March 27, 1948

CHEMISTRY

Recover Diamond Dust By New Simple Process

➤ DIAMOND dust from polishing tools used in General Electric's laboratories at Schenectady, N. Y., are recovered for re-use by what is claimed as a relatively new and simple process. Over 1,000 carats of this dust were recovered during the past year.

One use made by G. E. of the diamond dust, a material as fine as face powder, is to polish dies of tungsten carbide, one of the hardest compounds yet devised by man. In use the dust falls into a receptacle along with oil, tungsten carbide powder and bits of bristles and rags. In the recovery process all can be burned off except the tungsten-carbide and diamond dusts.

This residue is washed with concentrated hydrochloric acid which oxidizes the tungsten. Tungsten is hard to dissolve, but by placing the mixed powders in a furnace at 800 degrees Centigrade the tungsten oxide is converted into tungsten trioxide which is easily dissolved in a solution of sodium hydroxide, commonly known as caustic soda.

Science News Letter, March 27, 1948

THE FIELDS

CHEMISTRY

Check "Weed" Bacteria in Penicillin Mold with 2,4-D

➤ 2,4-D checks microscopic weeds in the laboratory as well as big ones in fields of cane or corn. Certain air-borne bacteria play the part of weeds in "crops" of *Penicillium notatum*, the mold that produces penicillin, stealing nutrients intended for it and inhibiting its growth. Two U. S. Department of Agriculture botanists, Elmer C. Stevenson and John W. Mitchell, have discovered that weak solutions of 2,4-D, from .02% to .08%, will prevent the growth of the bacteria without damage to the mold. The same treatment can be used for the protection of certain species of plant-disease fungi when these are intentionally grown for experimental purposes.

U. S. patent 2,437,766 has been issued on this discovery; rights are assigned royalty-free to the government.

Science News Letter, March 27, 1948

CHEMISTRY

Poison Ivy Chemical Now Imitated Synthetically

➤ URUSHIOL, which is the blistering compound that makes poison ivy such an intolerable nuisance, has been successfully imitated in a synthetic compound put together in the chemistry laboratories of Columbia University by Prof. Charles B. Dawson and Dr. David Wasserman. The new compound resembles the natural product not only in basic chemical structure but in physiological effects as well. Dr. Harry Keil of the New York Post-Graduate Medical School and Hospital is investigating this phase.

First use of the new synthetic ivy-poison analog may be for inoculation against poison ivy and its relatives, poison sumac and the poison oak of the Pacific Coast region. Principal value of the synthetic poison, however, will be in gaining a better understanding of the natural blister-raising substances, not only in native American plants but in Oriental lacquers and related materials which are derived from a small tree belonging to the sumac family.

Urushiol, the group-name of the poisonous principle in all these plants, both American and Asiatic, comes from the

Japanese phrase that means "lacquer-tree". It was coined in 1909 by a Japanese scientist named Majima, who was the first to isolate the poisonous, blister-raising compound. Later the close chemical kinship of poison ivy's toxin was demonstrated in this country.

Financial support for this research has been given by a New Jersey firm, the Irvington Varnish and Insulator Company. One of their best raw materials is an oil from the shells of cashew nuts. Botanically related to poison ivy and the poisonous Oriental lacquer tree, the cashew tree produces skin irritations resembling those of poison ivy. The company is therefore interested in obtaining a better knowledge of this toxic principle, for the better protection of its workers.

Science News Letter, March 27, 1948

ENGINEERING

Mud for Well Drilling Tested by New Apparatus

➤ THERE will be no "guess" in the so-called mud used in drilling deep wells if the mixture is laboratory tested in new apparatus developed by Norman E. Martello of Calgon, Inc., Pittsburgh.

The apparatus is relatively simple and inexpensive to construct. It circulates the mud mixture through it by a large centrifugal pump. The mud flows through a heated section where conditions encountered in action in the earth are simulated. A valve arrangement traps mud samples for viscosity checking. This viscosity can be checked periodically without withdrawal from the equipment. Chemicals may be added to the mud at any desired stage in the test period.

This mud is an essential in deep-well drilling. It is usually a mixture of certain clays, chemicals and water. It is pumped down the hollow shaft of the bit stock, lubricates and cools the cutting edge, and brings the debris from the bit to the surface through the bore outside the drill shaft. Another important function of the mud is to coat the walls of the bore, and also to hold back the oftentimes tremendous gas pressure encountered.

Modern drilling methods would be impossible without mud of low viscosity. In the well, the mud is being agitated and heated concurrently for long periods. These conditions may cause changes in the clays and the ordinary treating chemicals by complex reactions involving base-exchange, hydration or dehydration, or adsorption.

Science News Letter, March 27, 1948

AERONAUTICS

"Sweat-Cooling" System Aids Jet Engine Efficiency

➤ A "SWEAT-COOLING" system which operates in somewhat the same way as the body's perspiring has been found to increase the efficiency of turbo-jet engines, Dr. Pol Duwez of the jet propulsion laboratory, California Institute of Technology, told a national flight propulsion meeting of the Institute of Aeronautical Sciences in Cleveland.

Relatively large amounts of coolants are forced through porous metal walls of the combustion chamber at low pressures, Dr. Duwez explained. The common gases, nitrogen and hydrogen, have been found the most satisfactory coolants.

The coolant, forced in through the metal wall, forms a layer of gas between the wall of the chamber and the hot flame. This protects the chamber wall and reduces the heat loss.

In addition to increasing the efficiency of jets, the "sweat-cooling" will permit the use of different materials, in some cases ones less strategic or not in short supply.

Science News Letter, March 27, 1948

GENERAL SCIENCE

Rare New Zealand Parrots Eat Mutton, Not Crackers

➤ A TRIO of hard-to-please "Pollys" have arrived at the Balboa Park Zoo in San Diego, Calif.

The newcomers are three parrots that want meat—the fat lying about the kidneys of sheep, if you please—instead of the traditional crackers or the usual vegetarian diet of parrots.

Called keas, the meat-eating parrots are from South Island, New Zealand. They are rare even in New Zealand, probably because their unusual diet has not endeared them to sheep-raisers.

The keas' un-parrotlike taste for mutton is believed to be only about 80 years old. The kea formerly was a vegetarian in the manner of more common species. But they learned to eat meat during winter visits to the lowlands. Since then, hundreds of the birds have been killed by irate sheepmen.

Keas have a dull greenish-brown plumage and boast long, hooked bills.

The three keas in the San Diego zoo are the first brought to this country in several years.

Science News Letter, March 27, 1948

ASTRONOMY

Venus Now "Evening Star"

This planet exceeds by about 110 times the brilliance of the bright star Aldebaran, and becomes visible before any other star or planet comes into view.

By JAMES STOKLEY

➤ EXCEPT for the moon, the most brilliant object to be seen in the sky on April evenings is the planet Venus, which is now the "evening star." Its position is shown on the accompanying maps, which give the appearance of the sky about 10:00 p.m. at the beginning of the month and an hour earlier at the middle. Venus is in the constellation of Taurus, the bull, almost directly west, and a little north of the bright star Aldebaran. However, the planet exceeds the star in brilliance about 110 times, so it is visible long before any other star or planet comes into view.

Though brightest, Venus is not the only planet seen at present in the evening. Two others are high in the south, to the right of the hook-shaped group of stars in the constellation of Leo, the lion, known as the sickle. The one to the left, reddish in color, is Mars, which was so bright when it approached the earth in February. Now it is receding from our part of the solar system and is rapidly becoming fainter, so in April it is just about equal to Saturn. The latter, by the way, is just across the border, in the next-door constellation of Cancer, the crab.

Stars of First Magnitude

Several stars of the first magnitude appear in the April evening skies. Aldebaran, in Taurus, has already been mentioned. Another is Regulus, which is in Leo, at the end of the handle of the sickle. To the southwest there is Sirius, in Canis Major, the greater dog, near the horizon. Directly west is Orion, the warrior, with Betelgeuse, and above him we find Gemini, the twins, with first-magnitude Pollux. Below and to the left one sees Canis Minor, the lesser dog, with Procyon.

Across the southeastern sky there spreads the large constellation of Virgo, the virgin, of which Spica is the brightest star. Just above it is Bootes, the bear-driver, in which Arcturus shines. Low in the northeast Vega, in Lyra, the lyre, is just beginning to appear. Though this also is of the first magnitude, it does

not seem so. Because it is so low, the earth's atmosphere absorbs much of its light, and it looks much fainter. Later in the night, however, or later in the year during the evening, Vega is seen at full brilliance high overhead.

The big dipper, in the north, is now in its best position of the year. This familiar group is part of Ursa Major, the great bear. Below it, as indicated by the "pointers," is Polaris, the pole star, part of the little dipper, which in turn, is part of Ursa Minor, the lesser bear.

Jupiter Brighter than Mars

Another planet, Jupiter, rises in the east in the constellation of Sagittarius, the archer, about midnight. It is about nine times as bright as Mars or Saturn, though much fainter than Venus.

If you have been watching the skies attentively during the last few months, you recall that late last fall Venus first appeared in the western evening twilight, shining brightly there but setting soon after the sun. Since then she has been setting later and later, and all the time was increasing in brightness. On April 14 the planet will be farthest east, and will remain in the sky for about four hours after the sun has departed. After that it will start approaching the sun again, and by the end of June will be gone from the evening sky completely. During July, however, one will see it in the east, just before sunrise, and it will shine, as the "morning star," dur-

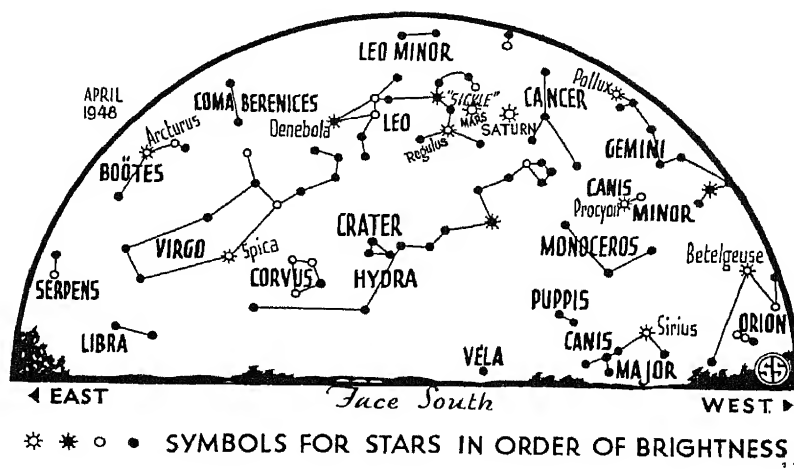
ing the rest of the year. On Sept. 3 it will be at the greatest distance west of the sun, and will then rise longest before sunrise.

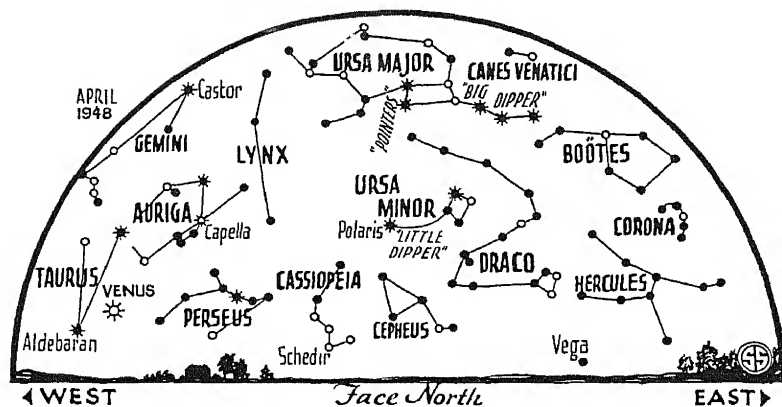
After that Venus will again draw toward the sun, though much more slowly, and a year from now it will be completely out of sight. But in the summer and autumn of 1949 it will repeat its behavior of recent months, again coming into brilliant view in the evening.

The reason for this is that Venus moves around the sun in an orbit that is smaller than that of earth. Whereas our average distance from the sun is about 93,000,000 miles, that of Venus is only 67,200,000 miles. It goes around the sun once in 225 days, where we take 365. When Venus, earth and sun are in line we say that Venus is in conjunction with the sun, calling it inferior when the planet is on this side of the sun and superior when it is on the farther side. It will be in inferior conjunction on June 24, and superior conjunction April 16, 1949.

Venus Having Change in Phase

After it passes behind the sun, it swings to the east of that body, and then remains in the western sky after sunset, as at present. It sets latest when, as on April 14, it reaches greatest distance from the sun in the sky. At the same time, as shown by a telescope, it is undergoing a change in phase, just like the moon. Like all the planets, Venus has no light of its own, but shines by reflected sunlight. When out beyond the sun, the entire sunlit hemisphere is visible and we can see it in full phase. Then, as it swings away





from the sun and towards us, more and more of the sunlit hemisphere is turning away, so it reaches a "half-moon" phase and then a crescent.

Unlike the moon, however, as it becomes a crescent it comes closer to earth, and thus appears bigger in the sky. This makes it brighter, even though we cannot see as much of the illuminated part as before. The brightest time of all comes when it is a crescent similar to that of the moon five days after it is new. It will be that way on May 18.

One reason that Venus is so bright is that it is constantly covered with clouds, which reflect from their tops about 50% of the sunlight falling on them. In contrast, the moon, of which we can see the true surface, reflects only about 7%. Because of this constant layer of clouds, we cannot tell by observation what the surface of Venus looks like. It has not been possible to tell exactly how long the day of Venus is—that is, how long it takes to turn on its axis. That it is about 30 of our days seems the most reasonable estimate at present.

Since it has clouds, Venus obviously has an atmosphere and studies made with the spectroscope, attached to large

telescopes, have given us some notion of its constitution. It contains no appreciable oxygen, or water vapor, but a great deal of carbon dioxide can be detected above the clouds. Since this gas is heavier than our air, where it is present in about three parts in 10,000, it is probably even denser on Venus below the clouds, so that life such as ours would probably be suffocated there. Thus, science fiction writers to the contrary notwithstanding, it seems very unlikely that there is any life on Venus.

Time Table for April

April EST		
1	5:25 a. m.	Moon in last quarter
	6:00 a. m.	Neptune nearest, distance 2,721,000,000 miles
4	1:00 a. m.	Moon farthest, 251,800 miles
9	8:16 a. m.	New moon
13	3:09 a. m.	Moon passes Venus
14	11:00 p. m.	Venus farthest east of sun
16	2:42 p. m.	Moon in first quarter
17	8:40 p. m.	Moon passes Saturn
18	4:50 a. m.	Moon passes Mars
19	8:00 p. m.	Moon nearest, 228,000 miles
23	8:28 a. m.	Full moon (a very slight partial eclipse of the moon will be visible at this time from the extreme western and northwestern parts of North America and much of the Pacific Ocean, Asia and Australia).
27	12:57 p. m.	Moon passes Jupiter
30	11:48 p. m.	Moon in last quarter

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, March 27, 1948

MEDICINE

Surgery Aids Mentally Ill

➤ A NEW brain operation which has restored 20 out of 24 helplessly sick mental patients to health was announced at a meeting at the New York Academy of Medicine.

The operation consists in cutting away certain areas of the frontal lobes of the brain. It is done for patients who are hopelessly depressed and show symptoms such as anxiety, obsessions, compulsions, and marked emotional tension.

A team of 100 psychiatrists, surgeons, psychologists and other medical scien-

tists worked to develop the new operation. They are associated with Columbia University College of Physicians and Surgeons in New York, the New Jersey State Hospital at Greystone Park, and the New Jersey State Department of Institutions and Agencies at Trenton. Because they feel that the results were due to their work as a team, they refuse to reveal any of their names.

Of the 24 patients operated on, 11 have left the hospital and are back at home and 10 are back at work.

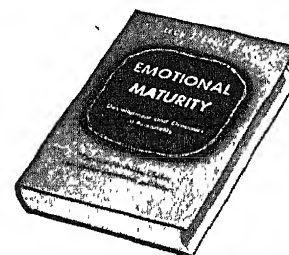
Science News Letter, March 27, 1948



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Do You Know?

As oranges ripen, the juice volume and sugar content increase, while acidity decreases.

Truck traffic is increasing more rapidly than any other type of highway transportation.

Heated trucks for snow removal are being considered; the snow would be melted in them and emptied into nearby drainage openings.

The number of persons admitted to American mental institutions each year is nearly as large as the number who are graduated from colleges.

GENERAL SCIENCE

Criticize Attacks Made on Loyalty of Scientists

➤ FIVE member-societies of the Federation of American Societies for Experimental Biology passed resolutions criticizing charges against the loyalty of scientists. The resolutions were passed at the Federation meeting in Atlantic City.

The American Physiological Society warned that "the effect of such attacks is to discourage loyal scientists and other citizens from entering government service," and to "distract and intimidate" many now in the government.

Science News Letter, March 27, 1948

TECHNOLOGY

Assembly-Line Eating Is Invention of English Trio

➤ EATING in restaurants is put on an assembly-line basis by a highly mechanized beanery, the invention of a trio of Englishmen, T. M. Lewis, E. G. Rounce, and C. G. H. F. Dunham. Their design shows all the earmarks of the exasperation born of standing endlessly in line waiting for a table to be vacated by a group of lingerers over coffee and cigarettes who show no inclination whatever to give some one else his turn to get a meal.

In the new-type eating-place, seats are side by side on a slowly moving conveyor belt. In front of the diner is another conveyor belt which is the table. There may also be a traveling footrest so that the patron's toes won't drag.

You sit down on an empty seat at the head of the line, as it pops up from beneath. A waitress sets before you the

first course, which comes up on a dumb-waiter. You eat the first course as you are moved along. By the time you come opposite a second dumb-waiter, the second course appears in it; the waitress sets it before you and whisks away your empty dishes. Again you eat against time until you come opposite the third dumb-waiter, bringing up your dessert.

METEOROLOGY

Forecast Wave Conditions

Swell Forecasting Section had job of predicting sea conditions for amphibious landings during the war. They did "swell" job, Navy official indicates.

➤ THE story of a pioneering group of scientists who played an important but little-known role in the invasion of Normandy and in other amphibious landings in World War II was disclosed at a conference in New York on ocean surface waves held by the New York Academy of Sciences.

The group was known as the Swell Forecasting Section. These scientists had the task of predicting sea conditions for amphibious landings. They did a "swell" job, it was indicated in a report to the conference by Charles C. Bates of the U. S. Navy Hydrographic Office, Washington, D. C.

Early in the war, crude methods of forecasting wave conditions were developed. In 1943, military meteorologists were trained, and early in 1944, a joint Swell Forecasting Section was set up at the British Admiralty to make predictions of conditions in the English Channel as a part of the preparation for D-Day.

After the invasion of Normandy, wave forecasting continued and improved as an aid in the landing of troops and supplies. Mr. Bates said that relationships were worked out between the height of the waves and the tonnage of supplies unloaded and landing craft casualties.

Later the Swell forecasters were transferred to serve the British East Indies Fleet and the Southeast Asia Command. When the war ended, the scientists were completing plans for wave forecasting for the planned invasion of Kyushu, Japan.

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Wave Recorder Developed

➤ A new set of instruments which can record and analyze ocean waves at a point several miles offshore were de-

scribed at the conference by Arthur A. Klebb of the Woods Hole Oceanographic Institution, Woods Hole, Mass.

Developed under contract with the Navy's Bureau of Ships, the equipment is portable and boasts minimum power requirements. Wave studies of seaplane landing areas and harbors may be important uses for the wave recorder, the scientist suggested.

U. S. patent 2,435,044 has been granted on this device.

Science News Letter, March 27, 1948

CHEMISTRY

Ethyl Alcohol Could Help In Gasoline Shortage

➤ ONE WAY to save gasoline in coming shortages is to use ethyl alcohol with it, Dr. G. E. Hilbert of the U. S. Department of Agriculture told the National Farm Chemurgic Council meeting in Omaha, Neb.

Blending one gallon of ethyl alcohol and nine gallons of low-grade gasoline will make 10 gallons of premium grade anti-knock motor fuel, he said. Or using a small gadget that automatically injects a mixture of alcohol and water into the engine when it is under heavy load will let a truck driver take the hills in high instead of at five miles an hour.

The use of alcohol as a motor fuel is not new. However, it depends upon price. At present prices of grain, alcohol is too expensive, he stated. But alcohol can be made from farm wastes such as corn cobs, and progress is being made in the development of a process to yield a cheap product. He cited work at the department's Northern Regional Research Laboratory, Peoria, Ill., of which he is director, in developing a fungal amylase that is produced by a mold that can be grown on distillers' stillage.

The amylase thus produced served as a substitute for the malt commonly used. This, he said, would lower the cost of ethyl alcohol about three cents a gallon.

A process developed at the laboratory for making alcohol from corn cobs was presented by Dr. Hilbert. It is the work of Drs. E. C. Lathrop and John W. Dunning. These studies are now being made on a semi-commercial scale. It

will be at least another year before full evaluation will be complete. It is not a question of being able to turn cobs into alcohol, he stated, but that of producing the alcohol at a reasonable cost. One of the largest cost factors is the transportation of the raw material. Another item is to find a profitable use for the by-products.

Science News Letter, March 27, 1948

ENGINEERING

Efficient Engines Needed

They need to be designed for better operation on the fuel produced. Closer cooperation is necessary between the automobile and the petroleum industries.

➤ **ECONOMY** in the use of gasoline demands full cooperation between the automobile industry and the petroleum industry so that engines will be designed to operate most efficiently on the fuels produced, the Society of Automotive Engineers was told at a meeting in New York by William M. Holaday, director of Socony-Vacuum Laboratories.

It is generally agreed that the refining industry must be expanded to handle another 1,000,000 barrels of crude oil per day in order to meet anticipated demands, he said. For fullest cooperation, the automotive industry must be fully acquainted with the fuel-production situation and steps that must be taken to satisfy expanded requirements.

The current domestic consumption is over 5,000,000 barrels of crude a day. Known reserves are larger now than at any other time, he declared. In addition, a potential productive capacity based upon the utilization of natural gas and coal gives added assurance of continued supplies of liquid hydrocarbon products.

The fact that significant increases in the octane number of motor fuels may be several years off, because of the necessary expensive construction, should not in any way impede the progress that the automotive industry can make in designing and producing engines and cars with improved performance and economy, he stated.

A critical examination of the manner in which antiknock quality is now utilized, and of the effect that various design changes may have on antiknock requirements will point the way to the goal desired by both the petroleum and the automotive industries, as well as the passenger car operator.

As a result of tests with cars, he suggested significant changes in engine de-

sign which would be effective in decreasing peak octane number requirements. They include a momentary decrease in spark advance at low speeds as the car is accelerated, improvement in intake manifolding to improve mixture distribution to the cylinders, the use of rich mixtures during high power operation, improved combustion chamber cooling, and use of water injection.

Mr. Holaday suggested a dual fuel system on autos, which would meter two fuels according to demand. One would be fuel high enough in octane quality to satisfy peak requirements during full-throttle operation, and the other a fuel of lower quality for normal cruising operations.

Science News Letter, March 27, 1948

PHYSICS

Supersonic Air Pressure Measured by Light Waves

➤ **LIGHT** waves have been harnessed for a new job. They are being used to measure the pressure and temperature of air moving at supersonic speeds through a glass-walled wind tunnel, Dr. Rudolf Ladenburg of Princeton University has revealed.

In these tunnels, tiny models of airplanes, wing sections or missiles are suspended and air forced through at high speeds simulating conditions encountered in flight. Light is passed through the tunnel from one side to the other, and also over the outside of the tunnel.

An instrument called a Mach interferometer, a new development in wind tunnel optics, is used to measure the air conditions. The device splits a beam of light into two coherent wave trains, one

of which passes through the wind tunnel and the other around it through a control chamber by means of mirrors. The two wave trains are recorded photographically, giving measurable optical effect.

In showing the action of a wing model on the air movement within a supersonic tunnel, what is called the "schlieren effect" has been used for several years. Dr. Ladenburg likened the schlieren effect to the glimmering above a pavement heated by strong sunlight due to air density changes.

The air movement, if traveling fast enough, builds up what are known as shock waves which seem to grasp the plane and hold it back. The shock waves can be photographed by schlieren photography. These are made by sending parallel rays of light crosswise through the tunnel above and below the model, and then into a camera.

The air in the shock wave is of a different density from that in other portions of the air flow and therefore refracts the light passing through it. When the light encounters the sensitized plate in the camera the refracted rays, no longer parallel to the others, make a record which is either a light or a dark spot.

Science News Letter, March 27, 1948

CHEMISTRY

Huge Metal Crystals Open New Field of Research

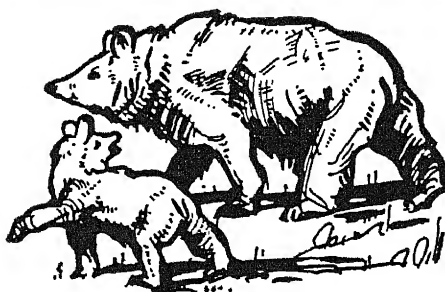
➤ **"SUPER CRYSTALS"** of metal created by University of Virginia chemists in Charlottesville, Va., are aiding research on surface chemistry which may help industry speed production or slow down corrosion.

Measuring up to one inch in diameter, the crystals are huge compared with millions of tiny crystals on the surface of ordinary metal. Because the sides of any crystal react differently to the same chemical process, the new, giant crystals are opening up a new field of research on metals.

From this study may come crystal faces on metals which are suited to special uses in industry. Thus, crystal faces with low reactivity might be used to reduce corrosion. Highly reactive surfaces might be developed to speed up reactions in the production of many products.

Dr. Allen T. Gwathmey, research associate in chemistry at the University, developed the "super-crystals" with the assistance of advanced students.

Science News Letter, March 27, 1948



Spring Awakenings

➤ SPRING, for most of us, signals its coming mainly with flowers and birds. We take notice sharply when we see the first dandelion or hear the first robin, and the good news is confirmed by the coming of the first bluebird and the opening of the first violet.

However, there are plenty of other creatures that have been missing all winter, and that begin to turn up about now. Although they belong to the animal kingdom, they have been more like the flowers than like the birds; they did not go south for the winter, but slept it out in burrows or nests or hidden chinks and crannies.

The "death-seeming sleep" of hibernation is resorted to by a wide variety of animals, and in a wide variety of ways. They range in evolutionary kinship all the way from worms and spiders to bats and bears, and their dormancy may be only a fitful few days at a time or it may be a solid unbroken slumber that lasts from the first frost to the last thaw.

There are very few safe generalizations about the winter sleep of any given class of animals. True, practically all reptiles

and amphibia that live in wintry countries retire for the winter into burrows in the ground, or into the mud at the bottom of ponds and streams. But you cannot extend that generalization either up or down the evolutionary scale. Fish do not hibernate, and only a relatively small number of mammals do. It used to be thought that no birds indulged in winter sleep, but lately a number of cases have come to light that seem to indicate that some birds do have at least short periods of dormancy in cold weather.

Even among the warm-blooded animals that evade winter by sleeping, there is no set rule. Some of the ground-squirrels are such complete hibernators

that if one of them is dug out of his burrow before he is ready to awaken he is very likely to be taken for dead. He will be limp and cold, with no perceptible pulse or breath. Shaking and noises have no effect on him—not even being struck with a pin will rouse him. Only several hours of slow warming will bring him to life.

Near the other extreme are the bears. They do retire into dens and are rarely seen again before spring. Yet they are known to emerge, for at least brief prowls, when a few bright, warm days interrupt the severity of winter. And in areas like the Gulf Coast, where winter troubles but little, they will scarcely hibernate at all.

Science News Letter, March 27, 1948

PHYSICS

Close to Absolute Zero

➤ TEMPERATURES lower than ever obtained, close to absolute zero at which substances contain no heat, are expected at Rutgers University with the assistance of a six-ton electromagnet just completed for the institution by General Electric at Schenectady.

The electromagnet, claimed to be the largest and most powerful of its kind, is not so designed that it could be used for lifting purposes. But it has a magnetic force equivalent to some 40,000 pounds. The influence of a strong magnetic field on certain salts will remove heat, and such fields have been used in recent years in attempts to reach temperatures in the range of absolute zero.

Absolute zero, approximately 460 degrees below the ordinary zero on the Fahrenheit thermometer, is the theoretic temperature at which a substance loses all molecular motion and the body would be without any heat. It is an unattainable temperature, scientists say, but it has already been approached to within a small fraction of a degree.

Temperatures within a few degrees of absolute zero have been obtained at the university with a complicated machine known as the Collins helium cryostat, named after its designer, Dr. Samuel Collins of the Massachusetts Institute of Technology, and built by Arthur D. Little, Inc., of Cambridge, Mass.

This device works somewhat like the ordinary household refrigerator. Highly compressed helium gas is forced through a tiny jet. The cryostat, in addition, makes the helium gas used in it operate a piston-driven engine as another means

of cooling the gas. For lower temperatures than obtainable with it the magnetic method is used.

This method utilizes what is called the magnetic cooling cycle. The magnetic field is said to influence the inner core of the atom instead of the cloud of electrons about it. The influence of the magnetic field upon the spinning atoms makes possible the drop in temperature. When a piece of soft iron, for instance, is demagnetized by taking the magnetic field away from it, it absorbs heat.

This new G. E. electromagnet is 56 inches long, 39 inches wide and 20 inches high. The electromagnet's two coils are 36 inches in diameter. They are precision built, with the pole faces almost perfectly parallel. The instrument will be used also to study magnetic susceptibility at extreme low temperatures and nuclear magnetic properties of various isotopes.

Science News Letter, March 27, 1948

Science Service Radio

➤ LISTEN in to a discussion on science and education in the Middle South on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p.m. EST Saturday, April 3. Dr. Rufus Harris, president of Tulane University, Dr. Joseph Morris, vice-president, and Dean Fred Cole, dean of College of Arts and Sciences, will be guests of Watson Davis, director of Science Service. The program will be in connection with the launching of an area development of the Middle South.

Science News Letter, March 27, 1948



WYOMING

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AIRCRAFT STRUCTURAL ANALYSIS—G. N. Mangurian and Norman M. Johnston, Eds.—*Prentice-Hall*, 418 p., illus., \$8.00. Prepared by the engineering staff of the Glenn L. Martin Company.

THE AMERICAN PEOPLE: A Study in National Character—Geoffrey Gorer—*Norton*, 246 p., \$3.00. A way of seeing ourselves as others see us—this time through the eyes of a British anthropologist.

THE ARCHITECTS MANUAL OF ENGINEERED SOUND SYSTEMS—*Radio Corporation of America*, 288 p. illus., loose-leaf with tab index, \$5.00. Including sound symbols, definitions and specifications with suggested applications of sound systems and typical layouts.

CHEMISTRY AT WORK—William McPherson, William Edwards Henderson and George Winegar Fowler—*Ginn*, rev. ed., 676 p., illus., \$2.88. An abundantly illustrated high-school text that is both attractive and interesting.

CHEMISTRY IN THE SERVICE OF MAN—Alexander Findlay—*Longmans, Green*, 7th ed., 390 p., illus., \$3.50. Giving the general reader an understanding of the implications and usefulness of modern advances in chemical science.

CHRISTIAN HUYGENS AND THE DEVELOPMENT OF SCIENCE IN THE SEVENTEENTH CENTURY—A. E. Bell—*Longmans, Green*, 220 p., illus., \$4.50. The biography of a great scientist one of whose achievements was the discovery of the rings of Saturn.

COMPENDIO Y DESCRIPCION DE LAS INDIAS OCCIDENTALES—Antonio Vazquez de Espinosa, transcribed from the original manuscript by Charles Upson Clark—*Smithsonian Institution*, 801 p., paper. A very ancient work about the Americas rediscovered in the library of the Vatican. In Spanish.

THE CONTROL OF ATOMIC ENERGY: A Study of Its Social, Economic, and Political Implications—James R. Newman and Byron S. Miller—*McGraw-Hill*, 434 p., \$5. The senior author has acted as White House adviser on science and atomic energy legislation. A "must" book on the atomic energy shelf.

ELEMENTS OF NOMOGRAPHY—Raymond D. Douglass and Douglas P. Adams—*McGraw-Hill*, 209 p., illus., \$3.50. Although written especially for students of mathematics, it will interest all those concerned with putting mathematical or statistical facts in graphic form.

EMANUEL SWEDENBORG—Signe Toksvig—*Yale University Press*, 389 p., illus., \$5.00. This biography was made possible by a Guggenheim fellowship. The life of Swedenborg had many facets, one of which was science.

ENERGY SPECTRA OF SOME OF THE BRIGHTER STARS—C. G. Abbot and L. B. Aldrich—*Smithsonian Institution*, 9 p., illus., paper, 15 cents.

THE ESSENTIAL OILS: Vol. 1, History, Origin in Plants, Production, Analysis—Ernest Guenther—*Van Nostrand*, 427 p., illus., \$6.00. A systematic survey.

HANDBOOK ON INSECT ENEMIES OF FLOW-

ERS AND SHRUBS—C. A. Weigel and L. G. Baumhofer—*Govt. Printing Office*, 115 p., illus., paper, 35 cents. With an appendix on DDT.

THE HOUSE FOR YOU TO BUILD, BUY, OR RENT—Catherine Sleeper and Harold R. Sleeper—*Wiley*, 313 p., illus., \$5.00. About picking the site, planning the home, and understanding the mechanical features and the quality and cost of materials.

HEALTH OF ARC WELDERS IN STEEL SHIP CONSTRUCTION—Waldemar C. Dressen and others—*Govt. Printing Office*, 200 p., illus., paper, 55 cents. A survey made by the U. S. Public Health Service in cooperation with United States Maritime Commission and United States Navy.

HIROSHIMA—John Hersey—*Bantam*, 116 p., paper, 25 cents. A reprint of a best-selling story of five survivors of an atomic bombing; it originally appeared in the *New Yorker*.

MENTAL HEALTH IN MODERN SOCIETY—Thomas A. C. Rennie and Luther E. Woodward—*Commonwealth Fund*, 424 p., \$4.00. "War," say the authors, "warps the emotions and personalities of many who wage it and of many who watch." This book describes experience in re-building mental health.

MINERAL RESOURCES IN THE UNITED STATES—Bureau of Mines and Geological Survey—*Public Affairs Press*, 212 p., illus., \$5.00.

MODERN PRACTICAL CHEMISTRY—A. E. Bell—*Longmans, Green*, 224 p., illus., \$2.00. A text prepared for British students.

ORGANIC CHEMISTRY—Ray Q. Brewster—*Prentice-Hall*, 840 p., illus., \$7.35. An outgrowth of experience in teaching organic chemistry to undergraduates in terms of the electronic and resonance theories.

OUR PLUNDERED PLANET—Fairfield Osborn—*Little, Brown*, 217 p., \$2.50. Having to do with the heedless destruction of natural resources.

PSYCHOSOCIAL MEDICINE: A Study of the Sick Society—James L. Halliday—*Norton*, 278 p., \$3.50. The author points out that the nation or the community, like the individual, has its physical ills linked with psychological sickness.

PUPIL PERSONNEL SERVICE—Frank G. Davis, Ed.—*International Textbook Company*, 638 p., \$3.75. Designed to aid counselors, school administrators and others in making education more personalized.

RESEARCH IN INDUSTRY: Its Organization and Management—C. C. Furnas, Ed.—*Van Nostrand*, 574 p., illus., \$6.50. Prepared by the Industrial Research Institute, Inc., for those interested in organizing or administering industrial research facilities.

SCIENCE YEAR BOOK OF 1948—J. D. Ratcliff, Ed.—*Doubleday*, 243 p., \$3.00. Articles selected from various popular magazines.

YOU CAN BE THIN! Slenderness Through Psychology—Herman Friedel—*Caxton House*, 117 p., \$2.00. Some points on the psychology of obesity with more on diet.

Science News Letter, March 27, 1948

ENGINEERING

Pacific Tides at Panama Higher than Atlantic

➤ THE average tidal range on the Pacific side of the Panama canal for years of record is 12.6 feet, it is stated in a prewar publication distributed by the Chief of Office, The Panama Canal. The greatest range recorded for successive tides is 21.6 feet.

On the Atlantic side, the average range is less than a foot, the leaflet states, while the greatest range recorded is 2.21 feet. Figures in the report of the Governor of the Panama Canal to the Secretary of War for the year ended June 30, 1946, show that during the year absolute tidal ranges at canal terminals were 21.5 feet on the Pacific coast and 2.46 feet on the Atlantic side.

These figures are given to correct an error in the *SCIENCE NEWS LETTER* for February 7, 1948, in which it was said that a proposed sealevel canal would be lockless except for one low construction to handle the approximately one-foot different tide elevations of the two oceans. The one-foot difference is that of mean sealevel rather than of tide elevations.

Science News Letter, March 27, 1948

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Absolutely no math background needed if you have the **PRACTICAL SLIDE RULE MANUAL** by J. M. Klock, formerly Mathematician for the U. S. Navy and Instructor in the Detroit Public Evening Schools. An absolutely non-technical explanation of how to use a slide rule for the fundamental math calculations. **STUDENTS** of all math, science, and technical subjects will find the use of a slide rule to be a great aid in their work. **SHOP AND TECHNICIANS:** special applications made to formulae from mathematics, engineering, aeronautics, air navigation, etc. The slide rule gives rapid solutions to all the basic formulae. **OFFICE:** and business administration applications are numerous. The slide rule is especially valuable in per cent and interest work, and cost accounting. The booklet includes chapters on these subjects. The slide rule is also a valuable rapid estimator.

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⚙️ **GREASE FILTER**, for installation in the canopy over a cooking range, is a conical steel screen that traps the grease vapors as they arise from the cooking, condenses them and lets the liquid drop into a cup. It prevents the grease from collecting in the flue where it is a serious fire hazard.

Science News Letter, March 27, 1948

⚙️ **LIGHTWEIGHT LAWNMOWER**, which looks like a carpet sweeper, has small rubber-tired wheels instead of heavy metal ones, and a light metal frame. It cuts a 17-inch swath, and can be used easily under overhanging shrubbery because of its special cover guard.

Science News Letter, March 27, 1948

⚙️ **SEALED BEAM** headlamps for locomotives are similar to those used on automobiles but contain two lamps that develop together 400,000 candlepower. The cover glass is all that ever needs cleaning because the filament, the highly accurate reflector and the clear cover glass are a single unit.

Science News Letter, March 27, 1948

⚙️ **PUMP-SCAFFOLD** brackets ease the job of repair work or painting inside or outside walls. One platform only is needed, together with two four-inch square uprights with a pump-bracket on each. The platform is raised or lowered by two workmen on it by manipulating the handles of the pumps.

Science News Letter, March 27, 1948

⚙️ **INSIDE-OUT MOTOR**, shown in the picture, has its rotating part on the outside and its stationary part on the inside, unlike ordinary electric motors. It



was designed especially for use inside a missile to cause it to spin at a rapid rate.

Science News Letter, March 27, 1948

⚙️ **NON-CURL CARBON** paper for typists has a vinylite plastic back coating, which improves moisture resistance and flexibility and adds to the strength of the tissue. The non-curl feature hastens handling by users in insertions and removals.

Science News Letter, March 27, 1948

⚙️ **TREE-PULLING** apparatus, recently patented, has a pair of jaws on arms to the rear of a truck which grasps the

tree trunk near the ground. A pulling cable, which passes over a pulley on an upright braced to the truck, is powered by an engine and winch on the vehicle.

Science News Letter, March 27, 1948

⚙️ **REFRIGERATING SYSTEM** for trucks engaged in hauling perishable foods operates on a 115-volt generating unit driven by a small gasoline engine while on the road, and is plugged into a municipal line when standing during stop-overs. The system is in an insulated case in the front section of the truck trailer.

Science News Letter, March 27, 1948

Soilless Gardening Hobby Kit For You



Contains everything needed to start growing vegetables and flowers. Pots are easily assembled, chemicals to feed growing plants, shiny mica material for roots to cling to, seven kinds of specially selected seeds. Grow seedless fruit, sprout roots on stems, experiment with colorful plastic tents for light-growth tests.

Question Box

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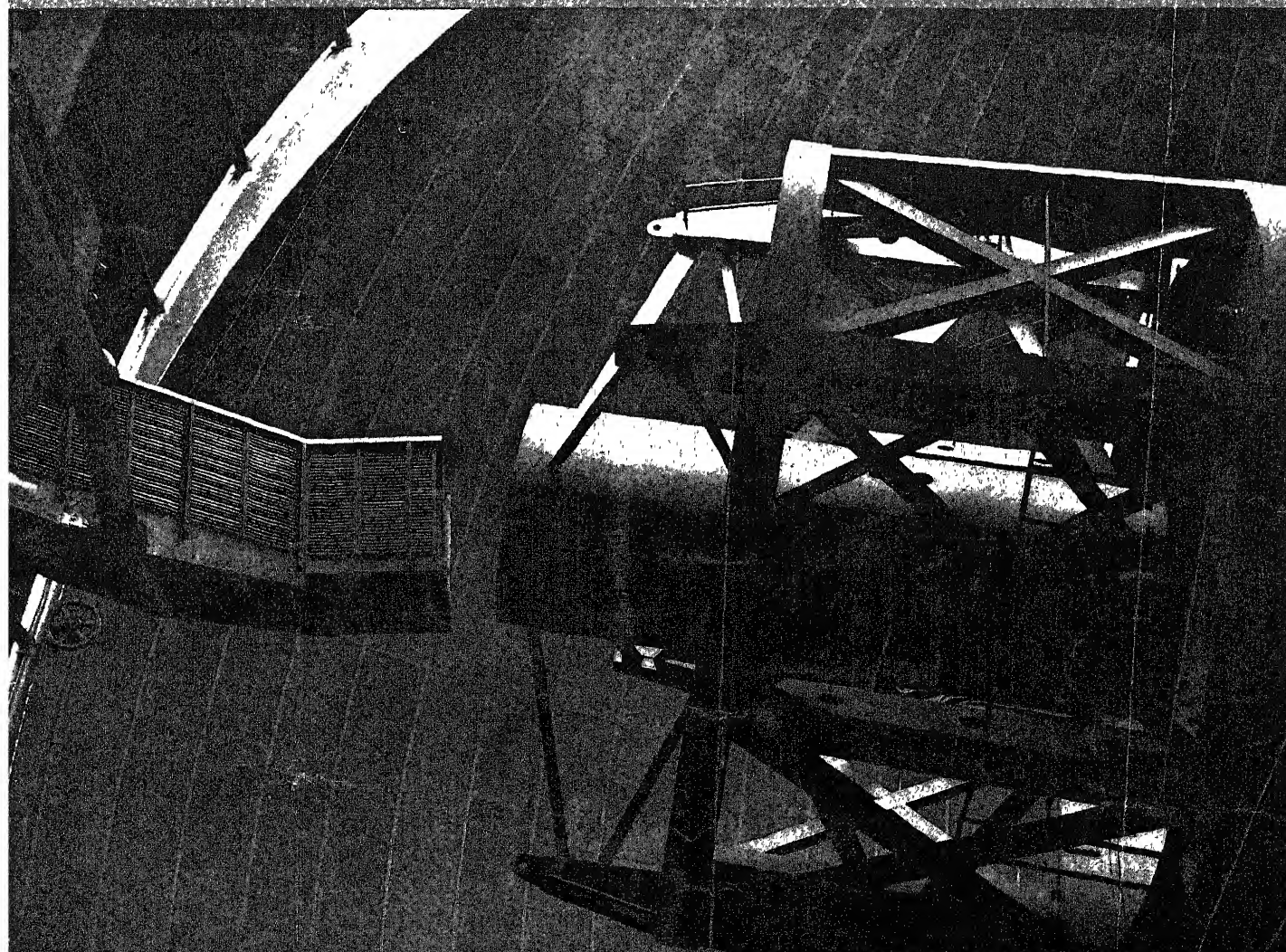
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New Delhi

Vol. 53, No. 14

THE WEEKLY SUMMARY OF CURRENT SCIENCE • APRIL 3, 1948



"Big Eye" of Palomar

See Page 218

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ENGINEERING

New Magnetic Oil Clutch

Of number one importance, this oil contains millions of iron dust particles or other magnetic material, which may also be used in automobile brakes.

➤ **MAGNETIC** oil is the key to a new automobile fluid clutch just revealed by the National Bureau of Standards. Its development is a discovery of number one importance. The oil contains millions of tiny particles of iron dust or other magnetic material. The car electric system magnetizes them as needed.

This new magnetic fluid clutch is very simple. It has three elements only, a driving shaft with a plate at its end, a driven shaft and plate, and the iron-saturated oil between. When a magnetic field is established between the two parallel plates, the magnetic particles form chains which bind the two plates together as tightly as if they were held by strong spring clamps.

Operation of the clutch is described as extremely smooth and without "chatter." The locking force is practically constant, and the bond between the two plates is a function of the gradual increase of the magnetic field, which is electrically controlled. The relation between the amount of magnetization and the bond between the plates is independent of speed. There is no point at which the clutch suddenly tightens to produce a jerk. Slip-

page is practically completely eliminated.

This magnetic oil may be used in brakes as well as in clutches, but according to its inventor, Jacob Rabinow of the Bureau staff, it has other applications which may be even more important. These are in servo-mechanisms, instruments to translate electronic "information" into appropriate action in purely mechanical equipment. Such devices are used for power steering of large trucks, tanks, steamships and airplanes. They are also used in printing presses, power machinery, for the control of radar antennas, gun direction control, and in high-speed electronic computers.

Since the amounts of electric power required to control the magnetic fluid clutch are small, it is a simple matter to interlock the electrical circuits with the speed, throttle setting and power demands. It has been found by experiment that the nature of the oil used has relatively little bearing on performance. Hence silicone liquids may be employed with excellent results, enabling the clutch to operate at very low and very high temperatures.

Science News Letter, April 3, 1948



MAGNETIC FLUID—It consists of a mixture of fine iron powder and oil which forms the heart of the NBS magnetic fluid clutch. When acted upon by a small permanent magnet, that portion of the mixture in the magnetic field "solidifies", as the iron particles become mutually attracted, and adheres to the magnet.

MEDICINE

Triple-Play Attack on TB

Promin, streptomycin, promizole and para-aminosalicylic acid are being used to fight the disease. Doctors hope to triple results.

➤ A **NEW** triple-play attack on tuberculosis is being made by scientists at the Mayo Clinic and Foundation, in Rochester, Minn. Promin, a drug once tried and abandoned, is being used together with two other anti-TB chemicals.

Streptomycin, most hopeful of the drugs combatting TB, is one of the trio, while both promizole and PAS (para-aminosalicylic acid) are used as the third chemical.

Results three times as good as with any one drug alone are hoped for.

News of this three-pronged attack on the white plague will reach medical

scientists through a report by Drs. William H. Feldman, Alfred G. Karlson and H. Corwin Hinshaw in the *Proceedings of the Staff Meetings of the Mayo Clinic* (March 3).

Promin had been tried as a TB remedy as early as 1940. But then it was being given to the patients in pills or capsules, and it had a damaging effect on red blood cells. So not enough could be given to get any good results.

Now it is known that much larger doses can be given safely if the drug is injected into the patient's veins. This was discovered by Dr. G. H. Faget, of

Lithgow Library

Research and Development Institute

the U. S. Public Health Service, when he tried it as a remedy for leprosy. Promin has proved so successful in leprosy that now the number of patients who get well and can be discharged from the National Leprosarium at Carville, La., is greater each year than the number of new patients coming to the institution.

These results with promin given by vein encouraged the Mayo Clinic group to try it again in tuberculosis. Studies with guinea pigs showed it was just as effective whether given by mouth, by vein or by injection under the skin.

By combining promin with streptomycin and either promizole or PAS, each of which has some effect against TB germs, the Mayo group hopes to get the sum of the benefit of each. In other words, the new treatment should be three times as effective as treatment with either drug alone.

Fortunately, the damaging effects do not add up that way. Promin can damage red blood cells, streptomycin can damage nerve cells, and promizole and PAS may have bad effects on stomach and intestinal tract. When all three drugs are given, it is possible to give small enough ones of each to avoid the dam-

aging effects without reducing the anti-TB action.

It will be "most difficult," the scientists point out, to determine the benefits of the mixture to the patients. But they

are also interested in the results on the tuberculosis germs. The combination treatment might delay the development of resistance by germs to streptomycin.

Science News Letter, April 3, 1948

CHEMISTRY

Improve Synthetic Rubber

This new low-temperature product, after exhaustive tire tests, has proved to be superior to other synthetically produced rubber and better than natural rubber.

➤ **SYNTHETIC** rubber, produced at much lower temperatures than used in most Buna S production, is better than the natural product, University of Minnesota chemists claim. The low-temperature process was developed in the university laboratories, at Minneapolis, and may result in sweeping changes in the American rubber industry's production methods.

The Minnesota process has been tested and modified in several industrial laboratories and has been tried out on a pilot plant stage, Dr. I. M. Kolthoff of the university staff stated. Exhaustive tire tests have proved that the new product is superior to any synthetic rubber previously produced and considerably better than natural rubber, he said.

Under usual methods of production of Buna S, the rubber formation in the mixture used takes place at a temperature of 122 degrees Fahrenheit, and the process requires from 12 to 14 hours. In the new process it is possible to make rubber within a reasonably short time at temperatures in the vicinity of the freezing point of water. In this process

an organic peroxide is used as a catalyst instead of the inorganic salts usually employed.

Key to the superiority of the new rubber lies in the fact that its molecules are more uniform than those in other rubbers, he explained. This uniformity results from effecting the polymerization process at the lower temperatures.

In making Buna S (GRS) rubber, the standard ingredients are 70 parts butadiene, derived from either petroleum or alcohol, and 30 parts styrene, chiefly a coal derivative. When the mixture is put into a container, the top layer is made up of these two ingredients, while below is a layer of water containing a dissolved emulsifier such as soap and usually a dissolved catalyst, an activating chemical agent.

When the mixture is stirred or rotated, polymerization takes place, and the resulting rubber particles remain suspended in the aqueous, or water, layer. With the addition of acid, such as sulfuric acid, the rubber particles coagulate into a pliable mass easily separated.

Science News Letter, April 3, 1948

mation for applying elsewhere.

The Hoover Dam is a combination flood-control, irrigation, hydroelectric power, and domestic water construction. Before its construction the "untamable" Colorado, as it was called, destroyed annually farmlands, homes, bridges and highways from near the Nevada boundary to the Gulf of California. Electric plants at the dam have a capacity of over 1,000,000 kilowatts. No water for irrigation and domestic uses is taken from Lake Mead, the Hoover Dam reservoir, but it is taken at lower points. These lower dams on the river, now safe from destruction by the flood-controlling Hoover Dam, supply water for giant irrigation projects in Arizona and California, and domestic water for the Los Angeles area.

Science News Letter, April 3, 1948

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ENGINEERING

Navy Checks Silt Deposits

➤ A SURVEY of the silt that threatens to fill the bottom of the Grand Canyon of the Colorado under the surface of the great reservoir behind Hoover Dam is now underway. Navy men and a miniature Navy fleet are assisting the Department of the Interior in this job.

The Navy fleet consists of a self-propelled 107 by 21 foot barge and smaller boats, all brought overland from the ocean. The men are divers but are also technical experts in the use of depth-sounding equipment, underwater photography and surveying. The investigations will show the amount of silt already deposited in the 12 years since water

was impounded. Anti-silting measures will follow.

The silting of this artificial lake, which when constructed had a capacity of 32,000,000 acre-feet of water, was foreseen when the dam was built. It was known that the turbulent Colorado would deposit its load of fine earth and sand when it reached the quiet waters in the reservoir. Reliable estimates of the rapidity with which the lake's bottom would rise could be made then. The data to be obtained now will assist engineers in designing the best silt-control methods suitable for use in this particular application, and much infor-

ENGINEERING

Pint-Sized "Memory" Unit

By reducing the physical size of this mercury unit developed for high-speed electronic computers, it has been made practical for use in commercial equipment.

➤ A THOUSAND numbers can be stored in a pint of mercury, "memory" unit developed for high-speed electronic computers, Isaac L. Auerbach told members of the Institute of Radio Engineers, meeting in New York.

Five million pulse signals per second can be sent into the mercury memory perfected by Mr. Auerbach, J. Presper Eckert, Jr., C. Bradford Sheppard and Robert F. Shaw of the Eckert-Mauchly Corporation of Philadelphia.

The device, details of which are revealed for the first time, is based on a radar development. It is said to be ten times as fast as former methods. Recent developments have made it possible to reduce the physical size of the delay memory unit so that now it is practical for use in commercial equipment.

Large business and mail order companies, as well as banks and statistical groups, are expected to benefit by this new development. A computing system using the new mercury memory can operate so fast and thus handle such a tremendous volume of data that it promises great economies in routine work.

Sound waves traveling through a column of mercury are the means used for storing numerical data and operating instructions. Quartz crystals resonant at frequencies between ten and fifteen million cycles per second are used.

Two little crystals are placed at opposite ends of the mercury column. One acts as a loud speaker, transmitting supersonic code pulses like Morse Code when pulsed with electrical signals. These pulses, representing the numbers to be remembered, travel down the

column of mercury to another crystal. This acts as a microphone and changes the pulses back to electrical signals.

The sonic code pulses, Mr. Auerbach explained, travel only one-millionth as fast in the mercury column as do electrical signals on a wire. The first pulse transmitted is not received by the second crystal until thousands of pulses have entered the column from the transmitter.

The code pulses are effectively "remembered" during the interval that they are traveling down the column. If the numbers must be remembered for a longer period than it takes them to pass through the mercury column, the code signals are returned electrically to the transmitting crystal and again pass through the mercury column. By repeating this process, data can be stored as long as desired.

The electrical signals in the model are compressed into a column of mercury only one-fourth as long as in early designs. To do this, all parts of the circuit were made to operate four times as fast as before. A second achievement of the new model is that most of the accurate machine work, which has made other designs costly, is eliminated.

A mercury "memory" slightly larger than the one reported here is used in the UNIVAC (Universal Automatic Computer) described at the meeting by Dr. John W. Mauchly, president of the company. This can hold as many as 1,000 twelve-digit numbers. Data and instructions placed in this built-in memory are immediately accessible to the machine for use in its computations.

Science News Letter, April 3, 1948



MERCURY MEMORY UNIT—
The mercury tube shown here being held by Isaac L. Auerbach, one of the men who perfected it, is the core of the new memory system in which a thousand numbers can be stored. Just revealed, it is said to be ten times as fast as former methods.

a survey they recently made.

The survey covered a six-months period in which 1,500 measurements were made and 500 photographs taken within a 50-mile radius of New York City. In addition to the ground survey, measurements were taken from an airplane which flew 2,000 miles within a radius of 200 miles of the city.

Great variations in signal strength beyond the horizon were observed with changes in the atmosphere, they said. These may occur very rapidly, or the variation may be a very slow change throughout the day or season.

The survey indicates the desirability of locating a transmitting antenna well above any structures in the vicinity. This eliminates the possibility of ghosts which originate in the vicinity of the transmitter and which can not be removed by anything done at the receiver or receiving antenna. Higher power at the transmitter will increase the signal-to-noise ratio at receivers. These two changes at the transmitter would permit a cleaner, more stable picture, they concluded. At the receiver location, the antenna should be installed as high up and as far away from noise sources as practicable.

Science News Letter, April 3, 1948

RADIO

Television at a Distance

➤ THE popular belief that television reception is restricted to line of sight, that a person at the receiving antenna should be able to see the transmitting antenna on a clear day, is not true, the Institute of Radio Engineers, meeting in New York, was told by T. T. Goldsmith, Jr., and R. P. Wakeman of Allen B.

DuMont Laboratories, Passaic, N. J.

Actually the signal strength simply decreases quite rapidly beyond the horizon of the transmitting antenna, they declared. That there is sufficient signal to produce satisfactory television pictures far beyond the horizon, even 125 miles from the transmitter, is shown by



TESTING GUNS IN EXTREME COLD—Braving 70-below-zero cold to test guns and ammunition, these Navy ordnancemen are loading a 50-caliber machine gun. Almost all gear is electrically operated by remote control. The suits worn by the men contain electric heating units and the guns are fired through quick opening ports.

ORDNANCE

Cold Armor Plate Tested

► TESTING armor plate, cooled to extreme low temperatures, for the effects of gunfire is one of the projects conducted at the Naval Proving Grounds, in Dahlgren, Va.

Five-inch thick armor steel plate is subjected to minus 70 degrees Fahrenheit in one of the Navy's cold chambers for 24 hours. Then it is packed in dry ice and rushed to a nearby range where it is peppered with shells to test its resistance at extreme cold.

Not all temperature testing at this station is at the lower end of the thermometer scale. High heat is also used, including tropical temperatures up to 140 degrees. The range from plus 140 to minus 70 degrees is thought to be un-

equalled by nature at any one location.

The equipment includes two cold chambers large enough to accommodate a five-inch gun, and a high-altitude chamber which permits simulation of conditions at 50,000 feet above sea level. In all, the controlled temperature facilities include the altitude chamber, an instrument test chamber, a gun test room, and a tank test room. This latter is used particularly by the Army. It is 37 feet long, 15 feet wide and 16 feet high. Its temperature range is from 125 degrees above to 67 below zero Fahrenheit. Although no firing can be done in this room, it makes possible a number of studies in the climatic adaptability of equipment.

Science News Letter, April 3, 1948

AERONAUTICS

Seaplane Tests Radar

► THE departure from New York to Germany of an all-cargo plane with a radar nose and improved radar equipment marks the beginning of a year of

testing to determine the most practical uses of this navigation aid in over-ocean flying. Many transports on over-land routes are now using radar.

This test project is with a Douglas DC-4 plane of the Pan American World Airways, and is being conducted jointly with American Airlines. Findings will be available to the U. S. Navy which requested the undertaking. The regular nose of the plane has been replaced with a plastic dome to contain the radar antenna.

The installation will enable a pilot to "see" on his radarscope the ocean surface below or the area ahead for some 40 miles in spite of heavy overcast weather. It will enable him to detect cloud formations that spell bad weather or turbulence so that he can make a detour. This contributes to safety and smooth flying.

Installations of radar altimeters have recently been completed in 109 planes of the United Air Lines as well as in many planes of other companies. These instruments, sometimes called terrain clearance indicators, transmit radio signals to the ground and receive back reflected signals that give a continuous reading of the contour below and also a warning signal if the plane approaches too close to the earth for safety.

All planes of the Trans-World-Airline (TWA) are now equipped with the relatively new Howard Hughes radar anti-collision device. This can be set to give automatic warning of mountains ahead or earth below at either 2,000 or 500 feet away. It is a radar transmitter-receiver set, weighing 15 pounds, which obtains power from the plane's battery at 28 volts.

The development of light-weight radar makes these installations in commercial planes possible. The wartime types used by the armed services were too heavy for commercial planes, took up too much room and required too many operators.

At the close of the war, the Air Force Materiel Command, in collaboration with other agencies including radar manufacturers, set about making light-weight radar. A set weighing 125 pounds, one-fourth the standard Army type weight, was completed. General Electric, one of the collaborators, later announced an apparatus weighing from 100 to 150 pounds, with a gyroscopically stabilized antenna, which was eight times more powerful than the previous Air Force model.

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Rubber in chlorinated form is used in special types of protective coatings made by paint manufacturers for use where a high degree of resistance to acids and alkalis is essential.

MEDICINE

Mass Vaccination for TB

Eleven European countries are about to enter into this program involving some 15,000,000 children. BCG, made from weakened TB germs, will be used.

► THE largest mass vaccination of children ever undertaken is about to get under way in 11 European countries. The vaccinating will be done in an attempt to stop the tuberculosis epidemic which has followed the war.

BCG, made from living but greatly weakened TB germs, will be used. The germs have lost their power to cause disease but are able to mobilize the body's TB-resisting forces and thus give immunity to the disease.

Some 15,000,000 children will be vaccinated, according to present plans. Before the actual vaccinating starts, 50,000,000 children will be tested for susceptibility to tuberculosis.

The testing and vaccinating will be under the direction of Dr. Johannes Holm, technical director of the Danish Red Cross. This organization and its Scandinavian associates, the governments of each of the 11 countries, and the World Health Organization are cooperating in the mass procedure for checking TB. The American Overseas Aid—United Nations Appeal for Children has voted \$2,000,000 from its funds to help finance the project, and has earmarked another \$2,000,000 for the same sort of TB fight now being planned for Far Eastern and South American countries.

The 11 European countries where the program will be launched immediately are: Finland, Albania, Hungary, Bulgaria, Czechoslovakia, Yugoslavia, Greece, Italy, Rumania, Austria and

Poland.

Tuberculosis cases are now four to five times the normal rate in Europe, Dr. Holm reports. More food and BCG vaccination at once are the only measures for checking the disease, in his opinion. A pilot test he conducted in Hungary showed that two-thirds of the children there already have or have had tuberculosis. On these figures he bases his estimate that 15,000,000 children throughout Europe, one-third of its child population, need BCG vaccination to help them escape the disease.

The BCG for the mass vaccinations will be produced by the Danish Serotherapeutic Institute in Copenhagen and the Pasteur Institute, Paris.

Several large scale trials of BCG vaccination are now under way in the United States under the auspices of the U. S. Public Health Service and state and municipal health departments. But general vaccination of the population in this country is not recommended by such TB authorities as the American Trudeau Society and the medical section of the National Tuberculosis Association.

When the vaccine is prepared under ideal conditions and given to tuberculin-negative persons by approved techniques, it "can be considered harmless," these organizations state. But they add that "the degree of protection reported following vaccination is by no means complete nor is the duration of relative immunity permanent or predictable."

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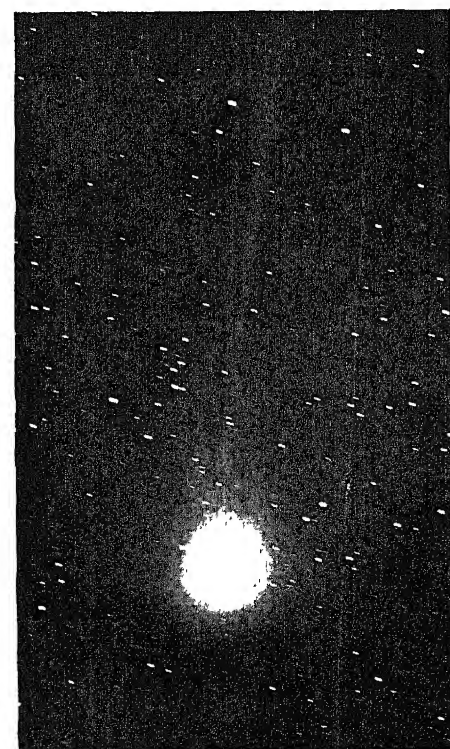
as was the case with Comet 1947n (See *SNL*, Jan. 31).

The comet is following quite exactly the path predicted for it by Dr. Cunningham last fall. It is less bright than astronomers had hoped, but then comets are notorious in being slightly fainter or brighter than predicted. It is also impossible to estimate accurately just what they will look like, or even whether they will have tails at all.

Those who wish to see Comet Bester will have to be real night-owls. It is visible just before dawn. On April 3 it will be about one-third of the way from the first magnitude star Vega to the first magnitude star Deneb Cygni. On April 7 the comet's right ascension will be 18 hours, 50.5 minutes, its declination plus 50 degrees, 26 minutes. On April 13 it will be directly north of the head of "Draco," the dragon.

So far this year, four comets have been reported, three of them later being picked up by other observatories. One of these, discovered by C. A. Wirtanen of the University's Lick Observatory, is unique in that it is the faintest periodic comet on record, Dr. Cunningham stated. It is now of the nineteenth magnitude.

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COMET BESTER—Now visible, its long, narrow tail comes from the comet's nucleus instead of being formed from the entire head, as was the case with Comet 1947n.

ASTRONOMY

Comet Bester Now Visible

► COMET BESTER, now visible through binoculars, is only one of 15 comets now known to be in the heavens.

It is the only one, however, that is bright enough to be easily found. The recently discovered Comet Pajdusakova-Mrkos can be picked up with a small telescope. A larger instrument is needed to find the others, one or two of which are as faint as nineteenth magnitude.

"If a tail like that on Comet 1947n, the spectacular southern-hemisphere

comet, had formed on Comet Bester," stated Dr. Leland E. Cunningham of Students' Observatory, University of California, at Berkeley, "it would have been a conspicuous object in field glasses or binoculars. With a stringlike tail that is but faintly visible at best, it appears mostly as a blob of light that moves slowly across the sky."

The long, narrow tail of the comet comes out of the comet's nucleus instead of being formed from the entire head,

GENERAL SCIENCE

Science Foundation Bills Again Before Congress

► THE establishment of a federal national science foundation this year is predicted now that identical bills understood to be acceptable to both Republican leaders and the President have been introduced into both houses.

The new bills remedy one of the reasons for presidential veto last session by providing for presidential appointment and Senate confirmation of the director of the foundation.

Sen. H. Alexander Smith, R., N. J., led a group of senators in introducing the bill into the Senate, while Rep. Charles A. Wolverton, R., N. J., introduced the bill in the House. The following senators joined with Sen. Smith in introducing the new bill S. 2385: Sen. Guy Cordon, R., Ore.; Sen. Chapman Revercomb, R., W. Va.; Sen. Leverett Saltonstall, R., Mass.; Sen. Elbert D. Thomas, D., Utah; Sen. Harley M. Kilgore, D., W. Va.; Sen. Warren G. Magnuson, D., Wash.; Sen. J. William Fulbright, D., Ark.

The legislative path of the new proposal has been smoothed by meetings of congressmen and at least tacit approval of the Bureau of the Budget. Scientists are expected to be united in their support.

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METEOROLOGY

World-Wide Weather Study Uses All Modern Methods

► A TEN-DAY world-wide weather study, which began April 1, is participated in by the United States together with 57 countries and will use all modern methods of securing meteorological information, the U. S. Weather Bureau revealed.

This program of meteorological research is under the sponsorship of the International Meteorological Organization, with headquarters at Lausanne, Switzerland. Plans were adopted for the observance of "International Aerological Days" by directors of the organization late last year. Dr. Sverre Petterssen, president of IMO's aerological commission, sent the program to the directors of meteorological services throughout the world in December.

In this they were requested to arrange for as many aerological observations as possible by the aid of radiosonde, self-recording instruments carried aloft by balloons; vertical ascents, balloon mete-

orographs, weather reconnaissance flights and commercial aircraft and pilot balloons.

The U. S. Weather Bureau, the Air Force Weather Service and the Navy Aerological Service will participate in the program. They will probe the air 11 miles or more above the earth to get maximum coverage for the first time since the war.

The upper-air reports from all services will be combined at a central point and, taken together with similar coverage by surface observations for the same period, will provide the basis for a composite global weather picture.

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BACTERIOLOGY

Swimming Bacteria Not Helped by Tail Wagging

► BACTERIA that swim do so in the manner of Bo-Peep's sheep, "wagging their tails behind them." Their real work of swimming is done by a twisting motion of the whole microscopic body of the bacterium, and what appear to be flagellae or swimming organs are mere accidental streamers strung out of the mucilage-like covering of the body.

This new interpretation on bacterial swimming is offered by Dr. Adrianus Pijper of the University of Pretoria, S. A., in a letter to the editor of *Nature* (Feb. 7). He states that in very critical observation of swimming bacteria, made under special lighting conditions, he has repeatedly seen what looks like a tail being passively dragged along, and taking no real part in propulsive action.

Science News Letter, April 3, 1948

WILDLIFE

Game Animal Population Gains 25% in Three Years

► GAME animals in this country are on the up-grade, U. S. Fish and Wildlife Service counts indicate. A compilation of game censuses from all sources shows an increase from 6,598,422 head in 1943 to 8,240,400 at the end of 1946, latest date for which counts are reasonably complete.

Deer greatly outnumber all other big-game animals, accounting for 7,375,200 out of the total. Other animals in numbers above 100,000 are elk, pronghorn, peccary and black bear. Populations of bison, grizzly bear, moose, bighorn, and woodland caribou are smaller; though some of these range up to 24,000 head.

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NATURAL RESOURCES

U. S. Producing Own Class Of "Displaced Persons"

► AMERICA is producing its own class of "displaced persons" by wasteful misuse of land and other natural resources, declares Guy Irving Burch, editor of the *Population Bulletin* (March).

"It is quite possible that the amounts of topsoil, forests, minerals and wildlife that the American people have needlessly destroyed by hasty exploitation could support as many as 40,000,000 human beings," he points out.

"If this is true, it may mean that there will be 40,000,000 fewer people in the United States than might have been had the American people taken proper care of their natural resources.

"The possibilities are that the number of displaced Americans may become even larger, because the United States still is exploiting its natural resources at a rate which is displacing about 175,000 people a year."

Science News Letter, April 3, 1948

MEDICINE

"Blue Baby" Operation Originators To Get Award

► THE "blue baby" operation which has restored hundreds of children to health has won for its originators the \$5000 Passano Foundation award presented each year by the Williams and Wilkins Co. medical publishers of Baltimore.

The award will be presented to Dr. Helen B. Taussig, associate professor of pediatrics, and Dr. Alfred Blalock, professor of surgery, Johns Hopkins Medical School, during the meeting of the American Medical Association on June 23 in Chicago.

This is the first time a dual selection has been made for the award, and the first time a woman has been named as a Passano award winner. Previous winners have been Dr. E. J. Cohn of Harvard, for his work on blood fractionation; Dr. Ernest Goodpasture of Vanderbilt for virus culture by the chick embryo method; and Dr. Selman Waksman of Rutgers for discovery of streptomycin, mold remedy for numerous diseases.

Science News Letter, April 3, 1948

E FIELDS

AEONAUTICS

Navy Jet Fighters Train With Air Force Planes

➤ NAVY jet fighters will train with 50 Air Force Shooting Stars, the P-80 built by Lockheed, it was just revealed. These planes will be used in the jet-training program for Naval aviators prior to the delivery of Navy carrier-based jet fighters in quantity.

The training for the Navy aviators will be at land stations, and the pilots will become familiar with flight characteristics peculiar to jet planes, tactical and gunnery problems and navigational flights. The jet fighters that are designed for carrier operation have high speed like the Shooting Star and also high performance at low speed to enable them to take off from and land on the relatively short decks of carrier vessels.

Science News Letter, April 3, 1948

RADIO

New Type Communication May Have Military Uses

➤ A NEW TYPE of communication for certain military and civilian uses was described to the Institute of Radio Engineers meeting in New York by Harry Stockman, Watson Laboratories, Cambridge, Mass. It may possibly be employed in communication between airplanes, or from ship to ship on the ocean. There are other applications of military interest.

This system utilizes invisible waves of radio, infra-red rays, or of sound too high-pitched for the human ear. They are sent from an instrument and returned to the same instrument from a distant reflector. On the outward trip they carry no message. Returning, however, they bring signals with meaning.

The reflector provides a key part in the system. It is a signal-excited reflector, excited by the waves received, that changes, or modulates, the waves before returning them. This modulation may be done in one of many ways, Mr. Stockman stated. They were listed by him as position modulation, damping modulation, effective area modulation, doppler modulation, and interference, amplitude, directional, and polarization modulation.

The following coded or modulated

reflectors may be mentioned, he said. They are turrets of corner reflectors, rotating with a speed controlling the modulation frequency; corner reflectors with variation in the path length of the internal beam components; and corner reflectors with variation of the reflection angle of the beam components.

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CHEMISTRY

Carnauba Wax Has Rival In Yucatan Waste Pulp

➤ THE Brazilian carnauba wax, widely used in America for polishes and waterproofing, now has a humble Mexican rival from the Yucatan peninsula, the Armour Research Foundation of the Illinois Institute of Technology in Chicago has revealed. It is extracted from the waste pulp from which henequen or sisal fiber for ropes has been taken.

The new wax has properties similar to those of carnauba. It is hard, has a melting point of approximately 185 degrees Fahrenheit, and bleaches readily to an almost colorless material for industrial finishes and coatings. Some 10,000,000 pounds annually can be made from available sisal waste pulp.

The product is one of the results of the industrial development research program being conducted in Mexico by the research foundation. Its program is conducted under the sponsorship of Banco de Mexico, and is designed to create new Mexican industries as well as to provide international credits through exports.

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GEOLOGY

Deep Submarine Canyons Found off New Guinea

➤ GREAT canyons have been found in the sea floor off the coast of New Guinea, R. C. Sprigg of the Australian Department of Mines announced in the British journal, *Nature*, Feb. 14. Cut in a bottom of soft volcanic mud, they range in depth between four and five thousand feet.

Theory for their cause most widely accepted at present is that during the Pleistocene ice age in northern lands, when much of the water was taken out of the sea and locked up in ice sheets on the land, rivers charging down steep slopes became submarine currents after they entered the ocean, and thus carved deep channels in the bottom. Similar submarine canyons have been found off the coasts of North America and Europe.

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ENGINEERING

Miniature Air Motor Delivers One Horsepower

➤ A TINY compressed air motor weighing 22 ounces built at State College, Pa., will deliver one horsepower when operated on air at 300 pounds pressure per square inch. It is an improved model of a Scotch device.

The original motor was developed by J. Haythorne, Technical Experimental Establishment, Greenock, Scotland. Modifications were made in the design, and the drawings sent to the Ordnance Research Laboratory here at Pennsylvania State College. The Scotland model weighed eight pounds and delivered one-half horsepower when operated at an air pressure of 350 pounds per square inch.

The improved motor, built from the drawings, runs at a speed of 4,000 revolutions a minute and, when properly mounted, does not have objectionable vibration.

Science News Letter, April 3, 1948

PSYCHOLOGY

Half of Criminals Found To Have Physical Ailments

➤ FIFTY per cent of criminals have indigestion, Dr. David Abrahamsen, psychiatrist at Columbia University, found from a four-year study of lawbreakers and their families.

The lawbreakers also suffer from heart trouble, nervous ills, skin trouble and respiratory diseases. Dr. Abrahamsen believes all these can be traced to friction in the home.

"Family tension breeds criminals," Dr. Abrahamsen concludes.

"Homes where there is bickering and nagging cause children to tighten up with resentment and hostility, resulting in their rebellion against authority and responding to the will of the gang."

Sometimes the criminal was treated cruelly in his home or failed to receive a normal amount of affection. In some cases he had dominating parents, in other cases weak ones. Sometimes a brother or sister was the favorite of the family and received more than a fair share.

Result: Jealousy, resentment, tendency to spiteful revenge and later not only criminal action but also illness of the kind in which psychological and physical elements are linked, as in stomach disorders, skin ailments and some kinds of heart trouble.

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ASTRONOMY

200-Inch to Test Theories

Hope to determine such problems as whether the universe is expanding, abundance of chemical elements in stars and if there are canals on Mars.

By MARTHA MORROW

See Front Cover

➤ THE 200-inch telescope on Palomar Mountain, in San Diego County, Calif., so enormous it completely overawes one, will only be given tasks fit for such a benevolent giant.

By taking a snapshot of Mars for the first time, it should allow astronomers to decide whether intelligent beings have lived on the planet.

Most of the time of the "big eye" will be reserved for hunting stellar "game" too distant or too faint to be caught by smaller instruments. It will be able to see millions of groups of stars so distant that the light it records started on its way to us a billion years ago.

The telescope will finally swing into action next June or July, predict officials of the California Institute of Technology and the Mount Wilson Observatory, responsible for its operation.

Its first problems will be designed to confirm, if possible, many theories which already exist. It may be within the power of this keenest-eyed of all telescopes to determine:

Whether the universe is expanding.

The relative abundance of chemical elements in the stars.

Whether there are canals on the planet Mars.

Structure of the Universe

The 200-inch telescope, because of its ability to penetrate into space twice as far as has ever been possible before, may help astronomers decide the structure and behavior of the universe as a whole. Up to the present, astronomers have had to infer the nature of the universe from the sample around us—the only portion they could see.

The Palomar telescope will permit us to explore a volume of space about eight times as great as that now available. It will give astronomers a larger sample with which to work.

Light from distant groups of millions of stars, when broken up by a prism, has been found shifted to the red end of the spectra. Many astrophysicists be-

lieve this indicates that these far-away nebulae are racing away from the earth and that the entire universe is expanding. By gathering in light from twice as great a distance as was ever possible before, the giant eye should make it possible to confirm this theory or indicate that this phenomenon must be attributed to some new principle of nature.

Enough light will be gathered by the 200-inch telescope to make it possible to spread the spectra of stars over a much wider area than ever before. By fanning out the light even farther, more detailed study of the spectra of stars and nebulae can be undertaken. By comparing data already obtained with what the new telescope tells us, astronomers may determine the relative abundance of chemical elements of stars and nebulae.

Such new data will bear directly on two fundamental problems: the source of stellar energy and the origin of chemical elements.

Great Light-Gathering Power

The telescope was not designed to study near-by planets, but to reach out farther into the universe than ever before, Dr. Ira S. Bowen, director of the Mount Wilson Observatory, who will also direct the observatory atop Palomar Mountain when it is completed, reports. But because of its great light-gathering power, the 200-inch makes it possible for the first time to take a snapshot of the planet.

All photographs of Mars in the past have had to be time exposures, many minutes being needed for the planet's faint light to show up sufficiently on the plate. But the shimmer or twinkling of the planet also showed up on the film and made it impossible to obtain a clear picture.

The 200-inch telescope will gather enough light to produce a picture that should be sharp enough to disclose the canals, if they exist. These so-called canals, if found, would probably be accepted as indication that intelligent life exists on Mars today or was there in the past.

These are a few examples of what may be accomplished with the 200-inch

telescope, that will surpass all others in resolving power, dispersion and space penetration. But many years will probably pass before these and other questions, that have been puzzling man for hundreds and even thousands of years, can be answered.

For the first time the new 200-inch Palomar telescope will enable astronomers to see visually some of the far distant nebulae with which they have been working for years.

Dr. Edwin P. Hubble, of Mount Wilson and Palomar Observatories, a leading investigator of the distant galaxies, looks forward eagerly to the night this will happen.

"Some of the nebulae we have been working on for many years with Mount Wilson's 100-inch telescope were not visible through the telescope but did show up on photographic plates, Dr. Hubble explained. "These we shall now be able to see through the 200-inch."

But ever striving to push back the veil of distance, Dr. Hubble and his associates will again be working with a set of nebulae, this time a new set, that cannot be seen visually. Only after photographic plates have soaked up their light for many minutes, or even hours, will they show up as pinpoints of brightness.

Distant nebulae such as these are very important in studying the evolution of star systems.

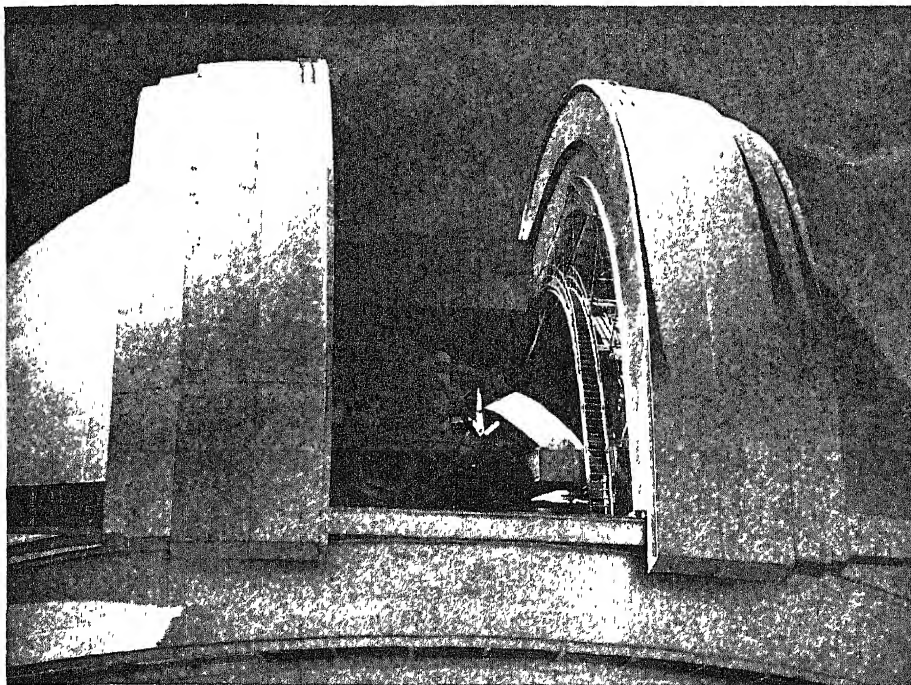
The 200-inch telescope is the world's most complete push-button observatory. The tremendous telescope atop Palomar Mountain is so perfectly balanced that a push of a button sets it in motion.

Telescope Moved Electrically

The telescope tube, complete with its cage, is 55 feet long and weighs 140 tons. Unlike small telescopes, that can be swung into position by a push of the hand or by simple mechanical means, the telescope is moved electrically.

So that little time will be lost when seeing is good, the telescope can be set so it automatically seeks a star's position. This automatic setting is accurate to one second of arc.

The telescope not only locates the star, but follows it across the sky. The speed with which the telescope slowly moves is adjusted to agree with the rate at which the star climbs up from the horizon. Either the astronomer who "rides"



PALOMAR TELESCOPE—This shows the 200-inch dome with its shutters open, revealing a portion of the telescope and the prime focus platform.

the telescope or his assistant at the controls below can set the telescope into motion.

A lot of light is thrown away by the 200-inch mirror of Palomar's giant telescope without cutting down its efficiency.

In the center of the mirror there is a hole 40 inches across. This is the exact size of the lens in the world's largest refracting telescope at Yerkes Observatory. This opening in the mirror was needed so light from the Cassegrain mirror could be brought to a focus below the mirror. It is not large enough to in any way affect the utility of the mirror. A certain amount of light must be cut off in all reflecting telescopes.

This is the first telescope so large that the amount of light it is feasible to throw away can hold a man. It is the only telescope in the world in which an observer actually rides. Photographs are taken and the astronomer actually sits in a 72-inch cage at the telescope's prime focus, high above the mirror, as shown on the cover of this week's *SCIENCE NEWS LETTER*. It is approached by a moveable carriage.

At present the supports on the 15-ton mirror are being adjusted and readjusted so that its parabolic surface will be accurate to within two millionths of an inch, irrespective of the direction in which the massive piece of glass is tilted. This high degree of accuracy was made

possible by Dr. John A. Anderson, who supervised the mirror's grinding and polishing.

The mirror, including the cellular back, is approximately 24 inches thick at the edges and 20½ inches at the center. But its solid face is only about 4½ inches thick.

Begin Work Early in Summer

The telescope is expected to begin work early this summer. At first it will be used solely for photographic work. Only the one gigantic mirror, in perfect adjustment, is needed for this. The plate is placed at the telescope's prime focus and six to a dozen photographs can be made a night, depending on the exposure required.

Although the 200-inch is the primary and most important mirror, the telescope will have six others. Three of these are convex and three flat. They will be used for the Cassegrain and Coude focuses.

The auxiliary mirrors, themselves several feet across, will be mounted in the telescope so that they can be used in any combination necessary. When not needed, they can be moved into positions where they do not obstruct other focuses.

Several enormous prisms will also be needed to complete the telescope. These are needed to study the spectra of distant

nebulae or faint stars.

It will probably be another two or three years before the telescope is really completed with all its auxiliary equipment, estimates Dr. Bowen. Although direct photography will be possible early this summer, spectroscopic studies must be postponed until the other mirrors and prisms are in position.

Another push-button telescope, located near-by on Palomar peak, is also expected to begin work this summer. This is the 48-inch Schmidt-type telescope, the largest of its type.

The Schmidt will map the skies and search for objects worthy of the "big eye's" time. This telescope is itself capable of reaching millions of light years out into space (a light year is the vast distance over which light, traveling 186,000 miles a second, passes in a year).

The Schmidt at a glance sees much more than the 200-inch. On one plate it shows a field 36 square degrees in area. The 200-inch telescopic giant pinpoints its vision on a field only a quarter of a square degree in area.

These two major telescopes and the

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Do You Know?

The buttery taste of *margarine* is obtained from milk which is treated with lactic acid bacteria, the same bacteria which give butter its distinctive flavor.

Light travels at about 11,000,000 miles a minute, so a *light-year*, a unit of distance used by astronomers, is about 6,000,000,000,000 miles.

Efforts to prolong the life of automotive and aviation engine pistons by coating the tops with pure *beryllium*, made in Germany during the war, gave promising results.

Bands of fertilizer along the rows, coupled with fertilizer plowed under, is said to be the best method of application for *tomato* plants.

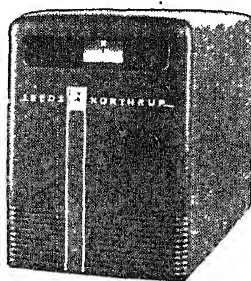
What is known as *bicolor lespedeza* provides a seed which quail and other wildlife enjoy.

Eggs labelled Extra Large must weigh at least 27 ounces to the dozen.

COMPACT

**SHORT
PERIOD**

**GOOD
SENSITIVITY**



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Write for further details.



JrL Ad ED22 (4c)

other smaller ones on Palomar Mountain are the property of the California Institute of Technology. The observatory, however, will be run jointly by Cal. Tech and the Carnegie Institution of Washington. The work at Mount Wilson and Palomar will be so integrated that the excellent telescopes on these near-by mountains, each best suited to a specific task, will be used to maximum advantage.

The 200-inch telescope represents man's most daring effort to reach out into space. It results primarily from the vision, foresight and efforts of the late Dr. George Ellery Hale, "father" of Mount Wilson Observatory. He ob-

tained from the Rockefeller Foundation the money with which to build the Palomar telescope and observatory. In all, more than six and a half million dollars was given to Cal. Tech. for this vast scientific instrument.

The telescope's construction has been under the direction of an observatory council headed by Dr. Hale and, after his death, by Dr. Max Mason.

Dr. Hale did not live to see his dream come true, but he did see it well on its way to completion. It is up to others—to those who use its fruits to unlock the secrets of the universe—to justify this tremendous undertaking.

Science News Letter, April 3, 1948

ASTRONOMY

Minor Planet Near Earth

Tiny asteroid is fourth or fifth known to have entered the earth's orbit. It will come within 15,500,000 miles of the earth and 84,000,000 miles of the sun.

➤ A NEW tiny planet, one of only four or five known to have entered the earth's orbit, has been spotted by C. A. Wirtanen of Lick Observatory of the University of California. It will come within 15,500,000 miles of the earth and 84,000,000 miles of the sun.

Minor planets usually whirl around the sun in orbits lying between the paths followed by Mars and Jupiter. But instead of staying between the orbits of these two large planets and thus keeping 140,000,000 to 485,000,000 miles from the sun, this asteroid gets even closer to the sun than does the earth.

When first spotted on photographic plates, the asteroid was of about the 13th magnitude, and thus visible only through a powerful telescope, states Dr. C. D. Shane, Lick Observatory director. Since then it has brightened slightly as it approached the earth, and is now 12th magnitude.

The tiny planet, about two miles in diameter, was discovered on March 7. It was found to be rapidly approaching the earth. On March 22 it was about 111,500,000 miles from the sun (the earth is 93,000,000 miles from the sun) and within 21,000,000 miles of the earth, calculates Dr. Leland E. Cunningham of the university's Students' Observatory. By March 30 it was less than 18,000,000 miles away. But there is no danger of this flying mountain crashing into our planet—it can never come nearer than 15,500,000 miles of the earth, study of

its path shows.

Only three or four asteroids of the known 1,600 previously have entered the earth's orbit. One of these came almost as near to the sun as the planet Mercury, the innermost of the planets. Each of these faint asteroids was visible for such a short time, however, that it was impossible to accurately calculate their paths and the length of time needed for them to race around the sun. They have since been lost in space.

Wirtanen's new asteroid, on the other hand, will probably not be lost. It has already been observed on several nights.

Going rapidly south of the earth, about the middle of April the planet will be directly under the earth; where it can be seen all night by observers in the southern hemisphere. At that time it will be just about as close to the earth as it can come.

The minor planet will make its closest approach to the sun on May 21. It will then be 9,000,000 miles closer to the sun than is the earth. But despite its nearness to the sun, it will probably be two or three magnitudes fainter than it is now.

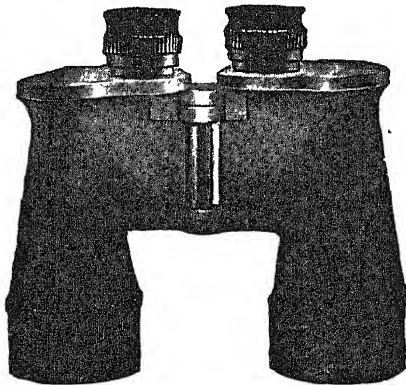
This is because we will not be seeing the fully illuminated disk of the planet, but only a part of it. Just as the moon at quarter is not as bright as when we see its entire disk lighted by the sun, so this asteroid will appear fainter even though nearer the sun than at present.

Science News Letter, April 3, 1948

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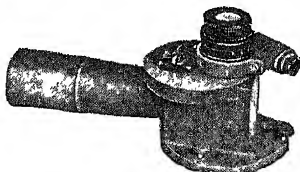
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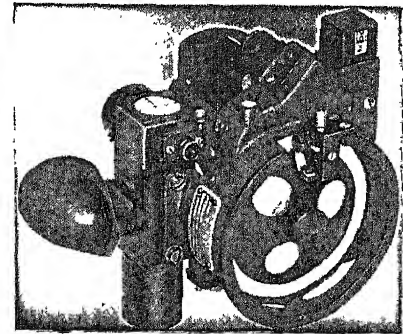
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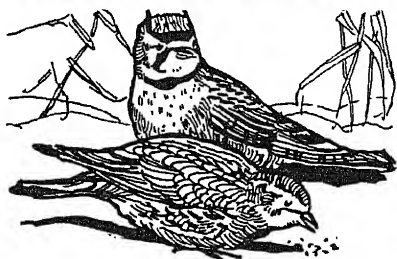
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Rejected Rainbow

➤ EXCEPT for man and some of his nearest relatives among the primates, most mammals seem to be color-blind. Birds, on the contrary, are clearly able to distinguish between colors. Principal exceptions are nocturnal birds such as owls, and crepuscular or twilight birds like whippoorwills; these distinguish colors either badly or not at all.

Not only are most birds able to tell colors apart, but they will hesitate to take food if it is of the "wrong" color. This was first noticed years ago when an effort was made to control the numbers of English sparrows by scattering poisoned grain. The birds would not pick up grain that had been soaked in Paris green or London purple, seemingly because it just didn't look right.

Now this reluctance to eat "off-color" grain is being used in reverse, to save useful song and game birds from being killed by poisoned grain baits intended for prairie dogs, ground squirrels and other rodent pests. The method was worked out by a biologist of the U. S. Fish and Wildlife Service, E. R. Kalmbach, at the field laboratory in Denver.

After the grain has been impregnated with poison it is dyed bright green,

saffron yellow, staring purple or flaming red. A spoonful is dropped at the mouth of each rodent burrow, and in 24 hours it is usually all cleaned up. But birds very rarely touch it.

Mr. Kalmbach has run scores of tests, offering grain (unpoisoned, of course) in its natural color and in rainbow hues to a wide variety of birds, from barnyard fowl to sparrows and doves. The birds regularly pick up the natural-colored grain and let the dyed grain lie, even when the choice means rejecting perfectly wholesome though strange-colored food. Rats and other grain-eating rodents, on the contrary,

pay no attention to color but pick up all the grain indiscriminately.

There is one partial exception to the birds' rule of rejecting colored grain. Ducks and other water-fowl will sometimes eat at least a little of it, though even they show a preference for natural-colored food. Mr. Kalmbach thinks it possible that this may be connected with the fact that water-fowl do a good deal of their feeding under water, where the food is either obscured by turbidity or even actually buried in the mud, and hence found by touch rather than by sight.

Science News Letter, April 3, 1948

• Books of the Week •

TO SERVE YOU: To get books, send us a check or money order to cover retail price. Address Book Dept., SCIENCE NEWS LETTER, 1719 N. St., N. W., Washington 6, D. C. In the case of free publications order direct from issuing organizations.

THE BEGINNINGS OF MODERN SCIENCE:

Scientific Writings of the 16th, 17th and 18th Centuries—Holmes Boynton, Ed.—Walter J. Black, 634 p., \$2.39. Here are some of the foundation bricks on which the structure of the atomic age is built.

CENTRIFUGAL AND AXIAL FLOW PUMPS: Theory, Design and Application—A. J. Stepanoff—Wiley, 428 p., illus., \$7.50.

FUNDAMENTALS OF PHOTOGRAPHIC THEORY—T. H. James and George C. Higgins—Wiley, 286 p., illus., \$3.50. A technical book presupposing basic knowledge of physics and chemistry.

KLYSTRONS AND MICROWAVE TRIODES—Donald R. Hamilton, Julian K. Knipp and J. B. Horner Kuper—McGraw-Hill, 533 p., illus., \$7.50. Covering the principles underlying the operation of the tubes known as klystron and planar-grid, basic to radar.

LORAN: Long Range Navigation—J. A. Pierce, A. A. McKenzie and R. H. Woodward, Eds.—McGraw-Hill, 476 p., illus., \$6.00. A technical book on the Loran all-weather navigation system for ships and airplanes.

MICROWAVE DUPLEXERS—Louis D. Smulin and Carol G. Montgomery—McGraw-Hill, 437 p., illus., \$6.50. Dealing with the use of a single antenna for both receiving and transmitting as in radar.

MICROWAVE RECEIVERS—S. N. Van Voorhis—McGraw-Hill, 618 p., illus., \$8.00. Discussing the receivers used in radar systems but including material applicable elsewhere.

PLANTS OF THE HOLY SCRIPTURES—Eleanor King—New York Botanical Garden, rev. ed., 23 p., illus., paper, 25 cents. Background information on bible plants in the light of modern scientific knowledge.

PRESERVATION OF GRAINS IN STORAGE—Stephen S. Easter, Ed.—Food and Agriculture Organization, (Columbia University Press), 174 p., illus., paper, \$1.50. Papers presented at the International Meeting on Infestation of Foodstuffs, Aug. 5-12, 1947.

PRINCIPLES OF FOOD FREEZING—Willis A. Gortner, Frederick S. Erdman and Nancy K. Masterman—Wiley, 281 p., illus.,

\$3.75. Covering all aspects of this new type of food preservation from the preparation of the food to the transportation and cooking.

PRINCIPLES OF JET PROPULSION AND GAS TURBINES—M. J. Zucrow—Wiley, 563 p., illus., \$6.50. The facts necessary for understanding this new field of engineering with a review of general principles.

RADIANT HEATING—Richard Woolsey Shoemaker—McGraw-Hill, 306 p., illus., \$4.00. Practical information intended not only for architects and engineers but also for home builders.

RADIO NEWS WRITING—William F. Brooks—McGraw-Hill, 200 p., \$2.75. Based on a course given by Columbia University Extension in cooperation with the NBC.

RUSSIAN ARCHITECTURE: Trends in Nationalism and Modernism—Arthur Voyce—Philosophical Library, 282 p., \$5.75. Tracing in text and a large number of photographs the history of architecture in Russia.

A TAXONOMIC STUDY ON THE GRASSES OF PENNSYLVANIA—Richard Walter

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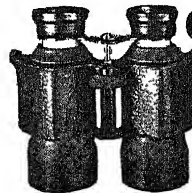
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Pohl—*American Midland Naturalist*, 91 p., paper, 90 cents.

THE TECHNOLOGICAL BASIS FOR NATIONAL DEVELOPMENT AND ITS IMPLICATIONS FOR INTERNATIONAL CO-OPERATION: A Statement of Guiding Principles for Study of Resources for Optimum Living Standards—Mary L. Fledderus and Mary van Kleeck—*International Industrial Relations Institute*, 44 p., paper, 50 cents.

A TREASURY OF SCIENCE FICTION—Groff Conklin, Ed.—*Crown*, 517 p., \$3.00. A collection of 30 stories for those fans who like to escape from this scientific world by voyaging into the strange realm of fantastic fiction.

UGARITIC MYTHOLOGY—A Study of Its Leading Motifs—Julian Obermann—*Yale University Press*, 110 p., \$2.75. From recently deciphered literature of a people who flourished in northern Syria some fifteen centuries before the beginning of our era.

VACUUM TUBES—Karl R. Spangenberg—*McGraw-Hill*, 860 p., illus., \$7.50. For engineers and physicists.

YOUR FARMHOUSE: PLANNING THE BATHROOM—Mildred Stenswick and others—*Govt. Printing Office*, 16 p., illus., paper, 10 cents. An aid to those planning a new house or just remodeling.

Science News Letter, April 3, 1948

POPULATION

Americans Will Be Older, More Conservative in 1975

➤ AMERICANS of 1975 will be more conservative and less willing to make political and economic changes, a scientist predicted.

Dr. Warren S. Thompson, director of the Scripps Foundation for Population Studies at Miami University, Oxford, Ohio, explained that there will be more older people in the population of the United States than there are now.

Dr. Thompson discussed the future population of the nation as a guest of Watson Davis, director of Science Service, on *Adventures in Science*, heard over the Columbia network. The authority on population trends was guest at the first broadcast of the program which on March 27 marked its eighteenth anniversary on the air.

Comparing forecasts of future population made in 1930 with those of today, Dr. Thompson declared that neither World War II nor the depression had greatly changed our outlook.

By 1975, he predicted, there will be twice as many Americans aged 65 or over as there are today. There will be more middle-aged persons, but fewer youngsters. And this change in population may have important effects on life in the U. S. 27 years from now.

"We'll probably become more conservative as we become an older people—we'll be more reluctant to make adjust-

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THE ALPHABET

By DAVID DIRINGER, D.Litt.

THIS book by the distinguished British archaeologist and orientalist, is one of the most important works of real scholarship published in this century. Historians and literary scholars, as well as others interested in the story of human progress will find this work of great value. Dr. Marcus N. Tod, the eminent Greek epigraphist of Oxford University, writes that the author's "learning and scope fill me with amazement."

The main text is divided into two parts, the first of which deals with non-alphabetic systems of writing over the whole world. The second part deals with the alphabets that have been or still are in use all over the world.

CONTENTS

First Part	Second Part
NON-ALPHABETIC SYSTEMS OF WRITING	ALPHABETIC SCRIPTS
I. Cuneiform Writing	I. Origin of Alphabet
II. Hieroglyphic Writing	II. South Semitic Alphabets
III. Cretan Scripts	III. Canaanite Branch
IV. Indus Valley Civilization and Its Undeciphered Scripts	IV. Aramaic Branch (incl. Arabic)
V. The Hittites and Their Scripts	V. Non-Semitic Offshoots of the Aramaic Branch
VI. Chinese Language and Writing	VI. Indian Branch (incl. Saurashtran)
VII. Ancient Central America and Mexico, and Their Scripts	VII. Further-Indian Branch (incl. Korean Alphabet and Woleai Script)
VIII. Mysterious Script of Easter Island	VIII. Greek Alphabet and Its Offshoots
IX. Other Ideographic Scripts	IX. Etruscan and Italic Alphabets (incl. Runes and Oghams)
X. Syllabic Systems of Writing	X. Latin Alphabet (incl. the English Script)
XI. Quasi-Alphabetic Scripts	

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ments in our political and economic institutions," Dr. Thompson forecast.

"More of the important positions in politics and in our economy will be in the hands of older men.

"And more business will actually be owned by older people.

"And these older people will resist changes that will weaken their power and appear likely to make their economic position less secure."

One possible danger from this change in population ages is the threat of economic stagnation, the scientist warned.

Science News Letter, April 3, 1948

Science Service Radio

➤ LISTEN in to a discussion on jet engines on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p.m. EST Saturday, April 10. Mr. Reinout Kroon, engineering manager of the Westinghouse Aviation Gas Turbine Division and Mr. Winston New, manager, will be guests of Mr. Watson Davis, director of Science Service. The principles of jet propulsion will be discussed.

Science News Letter, April 3, 1948

New Machines and Gadgets

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 408. To receive this Gadget Bulletin without special request each week, return \$1.90 for one year's subscription.

⚙️ **SMALL COLD-FRAME**, for home gardeners who want to have early plants, is a box with sliding covers of a plastic-coated wire mesh. The cover is lightweight, shatter-proof and hail-proof; it admits ultraviolet and infrared rays from the sun and holds the heat in.

Science News Letter, April 3, 1948

⚙️ **SPECIAL CONVERTERS** make television available to the many people who live in city areas and elsewhere served by electricity of the direct current type. No special wiring is required for them; they operate with a new-type automatic remote starting system.

Science News Letter, April 3, 1948

⚙️ **SHOWER CONTROL** for the bathroom consists of two special valves, one in the hot-water line and the other in the cold-water pipe, which are connected with two small copper tubes. It protects the bather from temperature changes when someone turns on a kitchen faucet.

Science News Letter, April 3, 1948

⚙️ **RAILROAD CAR washer** cleans the outsides of coaches, one car per minute, as the train passes. Upright rotary scrub brushes whirl as the car goes by. Jets of cleaning solution spray the coaches, then additional brushes shower cold water and give the train a final shine.

Science News Letter, April 3, 1948



⚙️ **MUSICAL HORN**, shown in the picture, has a full chromatic scale and is tunable by the mouthpiece. Fingering is like that of a simplified flute. The horn itself is made of a plastic that can stand abuse, careless handling and repeated cleanings.

Science News Letter, April 3, 1948

⚙️ **COLOR-PRINTING machine**, that will print on any material from tissue paper to six-inch-thick metal, is reported in England. It is little larger than a

typewriter, and is designed for the rapid reproduction of drawings, signs, notices, and even paintings, on wood, rubber, glass, textiles, plastic or metal surfaces.

Science News Letter, April 3, 1948

⚙️ **BUTT GAGE**, to simplify and speed the hanging of doors, is a steel die with a curved handle. The three sides of the gage have chisel cutting edges, accurately ground and honed. In use, it is placed on the edge of the new door, and hammered in.

Science News Letter, April 3, 1948

⚙️ **GLARE FILTER** is for use in automobiles to eliminate the hazard caused by glaring headlights behind the car reflected from the rear-view mirror. It is a plastic shield, neutral in color, that can be swung in front of the mirror when needed.

Science News Letter, April 3, 1948

Free—with a new subscription to

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Question Box

AERONAUTICS

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MEDICINE

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25 MAY 1948

SCIENCE NEWS LETTER

Vol. 53, No. 13

THE WEEKLY SUMMARY OF CURRENT SCIENCE • APRIL 10, 1948



New Flower Faces

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A SCIENCE SERVICE PUBLICATION

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The battle of the atoms

Telephone equipment is constantly at war against invisible forces of nature which seek to take it apart, atom by atom. On all fronts, Bell Laboratories chemists must fight corrosion—an enemy able to make a telephone circuit noisy or perhaps to sever it altogether.

An example: for years lead cable had lain protected in wooden ducts. Then in certain areas something began to eat the sheath, exposing wires to moisture. Corrosion chemists of the Laboratories were called in. The corrosion, they found, came from acetic acid generated in the wood during the preservative treatment then in use. They pumped in neutralizing ammonia. Corrosion stopped. Now telephone duct wood is controlled for acidity.

In a large city, smoke-polluted air was coating the silver surfaces of contacts with sulphide. Noisy circuits resulted. Chemists discovered minute traces of sulphur vapor in the air. They filtered incoming air with activated charcoal. Today, the latest telephone contacts are of palladium—not affected by sulphur.

Corrosion in metals is only one type of deterioration which engages Bell chemists against hostile forces. Plastics, paper, metals, rubber, textiles, coils, waxes and woods all have enemies. But knowledge, and persistence, are steadily winning out—to the benefit of the telephone user.

A Bell Laboratories corrosion engineer examining samples during an exposure test on corrosion-resistant finishes and alloys.

BELL TELEPHONE LABORATORIES



EXPLORING AND INVENTING, DEVISING AND
PERFECTING FOR CONTINUED IMPROVEMENTS
AND ECONOMIES IN TELEPHONE SERVICE

ASTRONOMY

Noise Heats Sun's Corona

Extreme temperatures of the sun's outer envelope may be due to the unheard noise of giant bubbles bursting on the surface of the sun.

► UNHEARD noise of giant bubbles bursting on the surface of the sun may help explain the heat of the sun's famed corona, outer envelope visible during a total solar eclipse.

This flaming layer of gas, extending thousands of miles beyond the surface of the sun that we normally see, is itself many times hotter than this solar surface.

The new theory that a stream of sound waves of inaudibly low frequency keeps up the high temperature of the corona—estimated at a million degrees—has been proposed by Dr. Martin Schwarzschild of Princeton University Observatory.

Photographs of the sun taken with high-powered telescopes reveal its surface to be thickly strewn with bright granules or gas bubbles. These bubbles, hundreds of miles across, exist but a few minutes. At any time about one-tenth of the sun's surface is covered with rising bubbles.

This tremendous bubbling of gases produces subsonic noise. But even if you could solve the transportation problem and survive the intense heat of the sun, you would not be able to hear it. The noise is of the same type as the "silent" sound of huge ocean swells, which, unlike the crashing of waves, you cannot hear. Outside the range of human ears, it may carry mechanical energy.

This steady stream of compression

waves, originating in the turbulent motions of the granules, passes upward through the photosphere or sun's visible surface. This region of the sun, however, is not visibly affected by the compression waves passing through it. Thus its presence is not betrayed in photographs of the sun.

When the noise reaches the less-dense region of the corona, its mechanical energy is converted into heat. The region through which it passes unnoticed, from the top of the granulation to the base of the corona, is about 500 miles wide.

"It appears likely that the energy stream in the noise produced by the turbulence of the granulation is sufficient in size to offset the heat loss of the corona," Dr. Schwarzschild explains in the *Astrophysical Journal* (Jan.).

Even though the noise carries into the higher layers of the corona only a small fraction of the energy of the granules, it is enough to provide the heat necessary for maintaining its high temperatures, Dr. Schwarzschild calculates.

How the high temperature of the corona, many times greater than that of the sun's visible surface, could be maintained has been one of the sun's mysteries. Dr. Schwarzschild believes that the noise of the sun's bubbling surface, flowing hundreds of miles out into space, may supply the corona with its great heat.

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Although development of this improved instrument has been thought possible for a year or so, it has only now been proved "to be really good," Dr. Kron stated.

In the past few years new developments have made it possible to reach out and record much fainter light at the blue end of the spectrum's red end. Now astronomers can work as effectively with near infra-red light.

The new infra-red photoelectric photometer works much more effectively at room temperature than such instruments did in the past when dry ice or some other refrigerant was used. Chilled with dry ice, its usefulness would be further improved.

The modification that made the instrument practical was actually that of cutting down the circuit's capacity. This reduced the time required for the star's brightness to be indicated.

In the new instrument, a resistor of ten billion ohms is used. To improve the instrument's seeing ability, a resistor of a thousand billion ohms was desired. But by this change, the indication time was slowed down from 10 seconds to 1,000 seconds.

To overcome this, all but 1 per cent of the electrical capacity of the entire circuit was cancelled by an electrical method.

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ASTRONOMY

Infra-Red Detected

► THE world's most sensitive instrument for detecting light in the near infra-red region of the spectrum of the sun or a star has been developed at Mt. Hamilton, Calif.

After a trial of several months, the effectiveness of the instrument has been proved beyond a doubt, Dr. Gerald E. Kron of Lick Observatory stated.

A modification in the circuit of the photoelectric photometer, used for detecting light too deep red for the eye to see, has made this possible. The only instrument of its kind is being used at

Lick Observatory of the University of California to study how much a star's light changes when one member of a two-star team comes between us and its companion. Another of these instruments is being built at Yerkes Observatory of the University of Chicago.

By only a minor change, the effectiveness of the photoelectric cell in the near infra-red region of the spectrum has been extended two magnitudes. This means it can record light only one-sixth as bright as was possible before with the best equipment.



DARING YOUNG APES—Shipped by air from Bangkok, Siam, to the San Diego Zoo, these gibbons are the smallest of the apes and are famed as the world's greatest aerial performers. Some zoologists rate these long-armed apes as the nearest approach to man among animals.

GENERAL SCIENCE

Science Bill Provisions

Third National Science Foundation measure provides that director and members be appointed by the President, confirmed by the Senate.

► HERE'S what the National Science Foundation will be like if both Congress and the President approve the identical S. 2385 and H.R. 6007 bills, a third try at enactment in three years:

There will be 24 members appointed by the President and confirmed by the Senate, who will serve for six-year terms.

A director, also a presidential appointee, is the most powerful person in the proposed setup, exercising powers of the proposed act within the general policies developed by the foundation. Last session President Truman vetoed the bill that provided the director should be elected by the foundation.

An executive committee consisting of the director and nine foundation members is charged with implementing the foundation policies.

The foundation would "develop and encourage the pursuit of a national policy for the promotion of basic research and education in the sciences." It is authorized to initiate and support basic scientific research in the mathematical, physical, medical, biological, engineering and other sciences by making grants, loans and other forms of assistance for the conduct of basic scientific research. It would appraise the impact of research upon industrial development and upon the general welfare.

Although a provision for a division of national defense, contained in last year's bill, has been eliminated, the foundation would initiate and support scientific research on national defense matters, after consultation with the Secretary of Defense.

Four divisions are specified, but the foundation may establish other divisions it finds necessary. Those specified in the bill are: Division of medical research, division of mathematical, physical and engineering sciences, division of biological sciences, division of scientific personnel and education.

The personnel and education division would handle the granting of scholarships and fellowships and would also be a central clearing house for information on scientific and technical personnel, maintaining a register of scientists and engineers.

Special commissions of 11 persons, five non-scientists and six scientists, are to be established to survey research in special fields and recommend over-all research programs. Three such special commissions on cancer, heart and intravascular diseases and poliomyelitis are specified in the bill, but the foundation may establish other special commissions from time to time.

Interchange of scientific information among scientists in the United States and foreign countries would be undertaken and through the Secretary of State arrangements could be made to aid research in foreign countries.

The foundation itself would not have authority to operate laboratories or pilot plants, but wide discretion is given by the bill to use appropriations for basic research work by organizations, government and private here and abroad, and individuals. Strengthening of research staffs of nonprofit organizations is specially mentioned. Any atomic energy research would be undertaken with the consent of the Atomic Energy Commission.

An interdepartmental committee of science criticized in the veto of last year's bill has been dropped.

Patent rights are left to the discretion of the foundation, as they were in last year's bill.

No money would be appropriated by the bill establishing the foundation, but organization would be possible immediately upon enactment of the legislation through transfer of funds from some governmental scientific or technical agency. The 1949 Presidential budget recommended \$20,000,000 for the first year of the foundation.

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GENERAL SCIENCE

U. S. Aid Suggested for Postwar German Science

► "SEVERAL foes of democracy or advocates of revenge have regained prominent educational positions" in Germany, an atomic scientist has charged in an appeal for American aid to German science.

Dr. Samuel A. Goudsmit of the Brookhaven National Laboratory described the situation in German scientific circles as "deteriorating rapidly." Dr. Goudsmit is the author of *Alsos*, a book describing the Nazi atomic research program.

Writing in the *Bulletin of the Atomic Scientists* (April), he declared that U. S. foreign policy should include both moral and material support for postwar German science. He called on scientists in this country to urge government action in aiding scientific work in Germany.

Promotion of the exchange of scientific literature with Germany and grants and supplies for German research were suggested by Dr. Goudsmit.

He urged American scientists to take greater interest in the situation.

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GENERAL SCIENCE

Protest Loyalty Procedures

Scientists protest investigations into their political beliefs even when their research has no connection with the government.

➤ MANY scientists "are concerned over allegedly arbitrary dismissals of certain of their colleagues," a report on loyalty clearance procedures in research laboratories by a committee of the Federation of American Scientists has charged.

"Scientists who used to consider that their positions depended only on the value of their scientific work, now find that their political beliefs are also being investigated, even when their research has no connection with the government," the Federation's Committee on Secrecy and Clearance declared.

The report complained that laws and regulations for clearance procedures offer "few safeguards against mistakes or arbitrary abuses."

Clearance problems are threatening to cost the nation's atomic energy program and military research work the services of valuable scientists, the group concluded.

Members of the committee, all Cornell University scientists, include one of the world's best-known atomic scientists, Dr. Hans A. Bethe, and a Nobel prize winner, Dr. P. J. W. Debye, chairman of the department of chemistry at Cornell. Dr. S. H. Bauer is chairman of the group, which includes Drs. L. M. Brown, G. K. Fraenkel, A. R. Moore, P. Morrison, R. S. Rochlin and R. R. Wilson. Their report was published in both *Science* (April 2) and the *Bulletin of the Atomic Scientists* (April).

The scientists sent questionnaires on loyalty clearance to 140 laboratories and received 57 replies, the report stated.

In laboratories of the Atomic Energy Commission, the committee found that clearances may be costing the Commission the services of loyal scientists.

"We have learned that many loyal scientists, lacking either knowledge of the criteria for clearance or confidence in the fairness of their application, have considered leaving the employ of the Commission for positions where they would be secure against unfounded accusations," the report said.

"Others, not now employed by the AEC, hesitate to apply for such positions for similar reasons.

"To the extent that this has occurred or may occur, the nation's atomic energy research will be impaired," the committee cautioned.

They said the clearance problem was "especially acute" in atomic laboratories where non-secret work was going on, but scientists were required to have "some type of clearance."

Warning against an "atmosphere of fear and uncertainty," the report asserted this "may cause many scientists to withdraw entirely from any type of civic responsibility."

The Atomic Energy Commission, it was pointed out, has appointed a Personnel Security Review Board, headed by Owen J. Roberts, former associate justice of the Supreme Court, to help solve clearance problems.

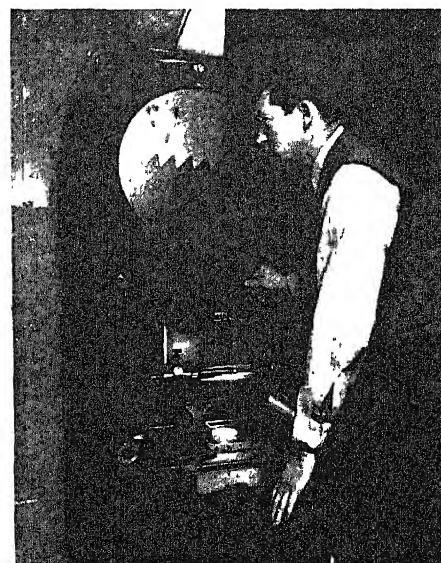
Military laboratories, the committee reported, were least willing to reply to the questions on clearance, while individuals dismissed from these laboratories charged that they had not been given a fair hearing.

"It may be assumed," the report declared, "that military officials have little interest in safeguarding their employees or employees of their contractors against unfounded charges.

"This may help explain why these laboratories are having difficulty in obtaining and holding scientific personnel."

Clearance regulations apply in other government laboratories and even in some industrial and university laboratories where scientists are not doing secret work, the report said.

The committee cited resolutions of the Federation calling for no "loyalty check"



MIRRORS AID PLANE PRODUCTION—A new industrial tool, mirrors, now plays a vital part in design, production and testing of modern airplanes. Used to measure and check accuracy of small tools and parts, this mirror magnifies the silhouette of the tested article, in this case, the threads of a screw.

on scientists doing work which is not classified, and that scientists be given a hearing in loyalty cases.

"The files of this committee contain many letters from biologists, chemists, engineers and physicists unable to learn why they are subjected to the financial loss and personal embarrassment of clearance denial.

"The letters often contain lengthy introspective passages on their belief in democracy and their frustration at being unable to speak on their own behalf," the report said.

The group of Cornell scientists said that the report was a summary. A more detailed statement of some clearance problems is now being prepared by the Federation committee, it was learned.

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GENERAL SCIENCE

Dr. Condon Is Defended

➤ REQUESTING that distinguished scientists be permitted to testify and that Dr. Edward U. Condon, director of the National Bureau of Standards, be given an opportunity to cross-examine witnesses, attorneys for Dr. Condon have sent a letter to the House Committee

on Un-American Activities regarding the hearing scheduled by the committee for April 21.

The letter from the attorneys, the firm of Arnold, Fortas and Porter, was signed by the three partners: Thurman Arnold, former assistant U. S. Attorney General;

Abe Fortas, former Under Secretary of the Interior; and Paul Porter, former administrator of the Office of Price Administration. They declared in part:

"The effect of the publication of your accusations against Dr. Condon, and of the inflammatory and reckless manner in which that was done, may be devastating to the national interest. There is abundant evidence that it has impaired the security and peace of mind of practically all of the leading scientists who are now employed on atomic bomb, radar, and related projects of fundamental importance to our security. Your actions must inevitably cause scientists to hesitate to accept work in these fields; and they will doubtless tempt scientists now employed in these activities to seek other work of less national importance where their reputations will not be exposed to irresponsible attack, and their civil rights will be safe.

"In fact, we respectfully suggest that the practices of your Committee may be retarding the scientific research which is the most vital part of our defense program.

"The number of scientists qualified for the exacting work required on many crucial projects is small. The need for their services at this critical point in history is great. Hitler drove out of Germany the very men qualified to discover the atomic bomb. Among them were Albert Einstein, Leo Szilard, James Franck, Hans A. Bethe, Otto Stern and others, who came to this country and made possible our development of the atomic bomb. Mussolini drove Enrico Fermi out of Italy. Dr. Fermi is now one of our most distinguished atomic scientists. The Com-

munist persecuted George Gamow, and forced him to flee the Soviet Union. Dr. Gamow is now one of our great nuclear physicists.

"These men and many others, including outstanding native American scientists like Dr. Condon, now have reason to wonder whether they will be allowed to work in this country, free from molestation.

"Nothing can serve the ends of Communism today better than the intimidation of American scientific personnel through such tactics as your Committee has followed in the Condon case to date. This Committee must avoid becoming an unconscious instrument of Communist purposes.

"We therefore respectfully suggest that the Committee exercise extreme care in proceedings involving this country's critically important scientific program and, further, that you avoid the possibility that your activities might aid and abet the very forces you seek to combat—namely, Communism and the apparent effort of its agents to create disunity and confusion in this nation."

Enclosed with the letter to the committee was a copy of an invitation letter sent out by Dr. Harold C. Urey, Nobelist in chemistry at the University of Chicago, as chairman of the Dinner to Edward U. Condon Committee. The dinner will be held "as a testimony of confidence by his scientific colleagues" in New York City, April 12. Sponsors of the dinner are more than 100 American leaders in various fields of science.

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PUBLIC HEALTH

U. S. Urged to Join WHO

Membership in the World Health Organization would offer the United States many advantages. Russia is now 24th member of this group.

► FAILURE of the United States to join the World Health Organization will be costly in health and money to the people of this nation.

We shall be letting the Kremlin outsmart us, instead of the other way around, if we fail to join, now that Russia has become the 24th member of WHO. We shall be denying ourselves a voice in deciding where WHO headquarters shall be located, who shall be its secretary general, what its policies and activities shall be.

A bill enabling us to join this organization was passed unanimously by the Senate last July. That same month the House Foreign Affairs Committee unanimously reported out the companion House bill. Medical, nursing, and other health organizations and organizations interested in furthering world coopera-

tion and world peace have united in support of the measure. But in spite of this support, and even because of it according to some rumors going the rounds in Washington, the House Rules Committee has tabled the bill indefinitely. This stops further action on the bill for this session of Congress, unless the committee can be induced to reconsider it.

To get an idea of the dollars and cents loss to the United States from failure to join WHO, you don't have to go any farther than the smallpox scare in New York last spring. One bus passenger with unsuspected smallpox crossing the border from Mexico cost Americans at least \$6,000,000. That sum is the estimated amount spent in New York City alone for vaccinations to stop an incipient smallpox epidemic. More money was spent in other cities for the same pur-

pose. WHO is not asking for more than \$6,000,000 from all its members combined for an entire year's work. And through WHO we and other nations could help Mexico wipe out smallpox so that the 6,000,000 persons who cross the border into our country each year would not be able to bring smallpox in with them.

Starvation and hunger in Europe, which is costing us in food, money, and worry over the danger of hunger-caused revolts and war, is directly tied up with the international health situation. There would be far fewer undernourished and starving men, women and children in Europe today if there were not so many people sick with malaria in other parts of the world.

Every year there are some 300,000,000 people in the world sick with malaria. About 3,000,000 die of it each year. Most of the world's malaria is in the world's bread basket areas. In India, China, and other agricultural regions of the world, the people are too weakened by malaria to work hard at farming, too sickly to learn modern methods of agriculture that would increase the yield of food for themselves and the rest of the hungry world. And they lack the strength and mental alertness to free themselves of this disease that drags them down.

Through WHO we could help them to wipe out malaria. Aside from humanitarian reasons, the financial outlay would be more than repaid in the reduced contribution we would have to make to feeding the world.

Our own health is in danger because of our failure to join and support WHO. Present-day quarantine methods can not be counted on to protect us from foreign diseases. Our health frontiers extend as far as our planes can fly. With India only 48 hours away, both plague and cholera can get into Chicago or other midwestern cities before any symptoms develop in the traveller importing it.

The only way we can protect ourselves from these diseases today is by helping to stamp them out at their source, in Egypt or China or India or anywhere else on the globe. Without help from an international organization, such as WHO, these nations cannot do the job. Without the help of our technical knowledge and financial support, WHO cannot do this important job effectively.

Commerce already is being aided by WHO's interim commission, just as that organization helped stop the spread of cholera from Egypt last winter. Its Singa-

pore station broadcasts daily to ships at sea, informing them of health conditions in various ports, so they know each day which ones can be entered safely and without financial loss due to quarantine delays.

Better protection against cholera is another immediate benefit coming from WHO's interim commission. The Egyptian experience showed that anti-cholera vaccines from various parts of the world varied greatly in potency. An international standard is now being set up through WHO.

MEDICINE

Starve Malaria Germs

Malaria germs cannot grow and reproduce without methionine. Conquest of malaria would help stop starvation throughout the world.

► **DRUGS** to stop malaria by starving the germs may come as a result of research by Drs. Ralph W. McKee and Quentin M. Geiman of Harvard Medical School in Boston.

The germ-starvation treatment, if it can be developed to a practical point, will help stop starvation and undernutrition in humans the world over, even in regions where there is no malaria. Much more food could be grown on a world basis if there were not so many hundreds of millions of malaria-weakened people in agricultural regions of the world.

The possibility of the germ-starvation conquest of malaria comes from the discovery that malaria germs cannot grow and reproduce without methionine. This

Streptomycin, and other new disease remedies from molds and germs, will also get international standardization through WHO. Patriotic Americans may feel a little unhappy if our scientists can have no part in standardizing the life-saving drug that we gave the world.

These are some of the more selfish reasons for our joining WHO. Americans who have always been ready to help unfortunate people anywhere know for themselves the unselfish reasons for joining an organization devoted to promoting world health.

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chemical is one of the protein building blocks, needed by man as well as malaria parasites. The malaria germs get the chemical from the blood plasma surrounding the red blood cells in which the germs live.

Growth of the germs in the test tube can be stopped by chemicals that are enough like methionine to fool the germs but which can not be used by them for growth and reproduction. Or other chemicals which react with methionine to stop it as a protein builder might be used.

Trial of such compounds in monkeys with malaria and search for other chemicals required by the germs is continuing.

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GEOLOGY

Earth's Crust Redated

► **ROCKS** and meteorites may be only about half the age that scientists have estimated in the past, thanks to the discovery that cosmic rays continuously generate within them helium gas that has been used as a geological calendar.

This means that a meteorite that was supposed to have fallen 100,000,000 years ago probably is only half that age.

This redating of the earth's crust arises from the research in South Africa by Prof. H. E. Huntley of the University of Witwatersrand, Johannesburg.

In photographic plates exposed on a

11,000-foot mountain peak to capture cosmic rays bombarding the earth from outer space, Prof. Huntley found that in the glass base of the plates the radiation disintegrates the glass atoms and produces helium at a considerable rate, at least 100,000 atoms per cubic centimeter each year.

Helium found generally in rocks has been attributed to radioactive minerals found throughout the earth's crust which also produce helium. This allowed scientists to set up a time-scale based on helium content.

If both the radioactive material in the rocks and the cosmic rays produce helium at about the same rate, then the ages assigned to rocks may have to be cut about in half. But the usual rocks are still many millions of years old.

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AERONAUTICS

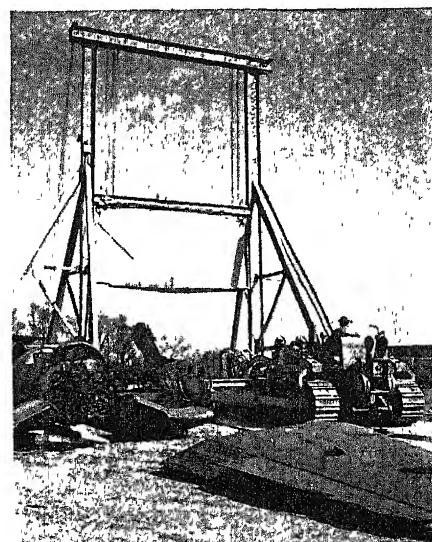
Giant Guillotine Chops Obsolete Airplanes

► A **GIANT** guillotine with a three-ton blade is busy daily at the Naval Air Station in Norfolk, Va., chopping obsolete and wrecked airplanes into sections so that the metals may be salvaged.

When the great knife is dropped 26 feet from the top of its standard, its force is enough to make a clean cut through the fuselage, wing or tail sections of a discarded plane, resulting in pieces small enough to put in melting pots for reduction to ingots. The blade of the guillotine is raised by electric power; it falls by gravity. The machine can handle 16 planes per day.

The salvage materials obtained from planes consist of heavy steel, light iron, aluminum, condemned tires, instruments and miscellaneous items. Reusable accessories are kept for future applications. All scrap batteries or other material containing lead are stockpiled for future military use.

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GUILLOTINE OF PLANES—Wrecked airplanes are chopped into scrap by this giant guillotine. The three-ton blade is raised by electric power, dropped by gravity.

ORNITHOLOGY

Lost Birds Find Home by Exploration Not Instinct

➤ BIRDS turned loose in a strange place far from home do not fly straight to their nests, guided by some mysterious instinct or some hidden sense that we earthlings wot not of. They cruise in curving lines, with a suggestion of spiralling, apparently getting home by plain ordinary exploration.

This is the conclusion reached as the result of experiments by two Cornell University ornithologists, Drs. Donald R. Griffin and Raymond J. Hock, whose report appears in *Science* (April 2).

The two men chose gannets for their tests, because these big white sea birds are easily seen at a distance, and because it was safe to assume that they had never of their own accord gone far from the coast. They carried a number of them into the interior of the Canadian maritime province of New Brunswick, where they turned them loose to find their own way home. Half of them they followed in an airplane, at a respectful height and distance; the rest they left unaccompanied, to see if the presence of the plane was a disturbing factor.

Only two of the birds flew in anything like a straight line for the coast, and both of these turned at right angles before they reached the shores of the Bay of Fundy. The others flew literally in all directions, making many turns and loops. There was no evidence whatever of a preternatural "sense of direction."

First gannet to get home arrived at its nest in 24 hours; others required up to 70 hours. Four failed to get back at all.

Average distance travelled in one day was 99 miles. This compares with a high of 141 miles for the swallow and a low of 17 for the starling.

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ANTHROPOLOGY

Eskimos and Indians Have Similar Blood Patterns

➤ ESKIMOS and Indians are closely related; in fact, Eskimos once were Indians. So declared Dr. Victor E. Levine of Creighton University in an address before the meeting of the American Association of Physical Anthropologists in Washington.

Dr. Levine's conclusions are based mainly on the close similarity between the blood group patterns of the two peoples. Eskimos and Indians alike have

the Rh factor in practically 100% of their numbers, and again are very nearly lacking in the N blood type. Both peoples have some blood-type resemblances to Chinese and Japanese, but differ from Asiatics in the same way.

Ideas on blood-relationship between Eskimos and Indians are supported also by studies of their present culture traits and by the archaeology of their ancient dwelling sites.

The general opinion, Dr. Levine stated, is that Eskimos originated as inland Indians, and later moved to their present home area along the Arctic ocean.

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MEDICINE

New Clinic to Study Multiple Sclerosis

➤ A NEW clinic for study of the baffling nerve disease, multiple sclerosis, opened at Beth Israel and Boston State Hospitals March 29.

The role of minerals, diet, and hormones, the effects of blood-vessel-dilating drugs, the spontaneous remissions and other changes in symptoms during the course of the disease and its geographic distribution in Massachusetts and New England will be subjects of study at the clinic.

Establishment of this clinic was made possible by a grant from the National Multiple Sclerosis Society which has headquarters in New York City. The Boston clinic is the first of several planned by the society. Another will soon be opened at Albany, N. Y., Hospital.

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GENETICS

Favorable Mutation Found in Snapdragons

➤ A MUTATION, or sudden evolutionary change, that gives its possessor an advantage in the struggle for survival has been found in snapdragon plants by two Austrian botanists, Drs. R. Biebl and M. Sturm of the University of Vienna. One objection to the mutation theory has been that practically all mutations are either deadly or at least disadvantageous.

The new snapdragon plants have the minute breathing-pores in their leaves so modified that water evaporates through them considerably more slowly than it does through the wider-open pores of the parent species. This gives the new plants better resistance to drought.

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ANTHROPOLOGY

First Farmers Still Resemble Ancestors

➤ DESCENDANTS of Europe's first farmers, who came to Greece from Asia Minor 6,000 years ago, still look very much like their ancestors, Dr. J. Lawrence Angel of Jefferson Medical College stated before the meeting of the American Association of Physical Anthropologists in Washington.

Dr. Angel and his wife took part in the excavation of the classic Greek city of Olynthus just before the war. At the end of the day's digging they would go, in late afternoon, to small cafes where the farmers gathered for relaxation. There they made photographs and took head and body measurements.

The farmers of this locality, they found, do not fit the average American notion of what Greeks look like. They were taller, less stocky, not so dark, had longer heads with more prominent cheekbones and more concave noses. In general, although these men were Greek in speech and nationality, their bodily type apparently identified them with the pre-Greek population whose skeletal remains have been discovered in the region.

Such survivals of ancient types can be found, as a rule, where at least partial isolation has tended to protect the community from admixture with other, later strains of population that have flowed into more open country.

Even so, Dr. Angel continued, the resemblance to the ancestral type is not complete. In some features the people of the region show inheritance from the less ancient classic Greeks of about 400 B. C.

Science News Letter, April 10, 1948

GENERAL SCIENCE

Half Million Given for Heart Disease Research

➤ MORE than half a million dollars for research in heart disease during 1948 will be given by U. S. and Canadian life insurance companies, through the Life Insurance Medical Research Fund. Hospitals, medical colleges, clinics and individual physicians are receiving grants.

Science News Letter, April 10, 1948

DE FIELDS

ELECTRONICS

Atomic Radiation Measured By Changing It into Light

➤ A DEVICE to measure atomic radiation by changing it into light is reported by Dr. James S. Allen of the Institute for Nuclear Studies, part of the new \$12,000,000 project of the University of Chicago, who has subjected it to thorough testing.

It is a German invention, the work of Dr. Hartmut Kallman of Berlin. The instrument tested was built by Dr. Allen from information furnished American scientists by government agencies investigating wartime atomic energy developments in Germany.

The device, called a scintillation counter, is a simple box containing a bit of fluorescent matter and a photoelectric cell surrounded by dry ice. Atomic particles admitted to the box produce bursts of light in the fluorescent matter. The light registers in the photoelectric tube where it is converted into electricity which can be amplified and measured.

The simple instrument is called an improved device for measuring radiation which may be a boon to researchers studying cancer and atomic problems.

Science News Letter, April 10, 1948

NUTRITION

Poor Diet Induces Pyorrhea But Teeth Remain Sound

➤ PEOPLE on such poor diets that they get pellagra or other vitamin deficiency diseases rarely have decayed teeth. But they are very susceptible to pyorrhea and as a result lose their teeth by the time they are 40 years old.

These findings have led to a new line of attack on the tooth decay problem by Drs. Tom D. Spies, Robert E. Stone, Samuel Dreizen and Henry Greene of Northwestern University, Chicago, and Hillman Hospital, Birmingham, Ala.

Many of the substances produced as by-products in the breakdown of the gums have decay-checking power, the scientists found. Test tube studies in which six of these substances were added to the saliva of persons susceptible to tooth decay showed the substances checked acid production in the mouth

and interfered with the growth of *Lactobacillus acidophilus*. This is the organism intimately associated with the development of tooth decay.

These findings led the scientists to a working theory that tooth decay and pyorrhea are antagonistic in their basic chemical nature and do not operate in the same mouth at the same time. The group is now "delving further into the interrelationships between diet, dental caries and periodontal disease (pyorrhea)," Dr. Spies reported at the meeting in New York of the Spies Committee for Clinical Research.

"We also hope eventually," he said, "to discover some substance or agent which is capable of being added to the fermentable foodstuffs of the diet and which will prevent or interfere with the ability of mouth organisms to break them down to lactic acid and thereby inhibit dental decay."

Science News Letter, April 10, 1948

AGRICULTURE

Triple Attack Used on Tough Tropical Weeds

➤ 2,4-D ISN'T enough for weeds in the tropics. It kills some but fails to harm others, so a triple attack must be used combining 2,4-D with another killer chemical known as pentachlorophenol and an aromatic oil left after gasoline refining, states Dr. A. S. Crafts in *Science* (Feb. 19). Dr. Crafts, a member of the agricultural faculty of the University of California at Davis, Calif., has been studying tropical weed problems at the Puerto Rico Agricultural Experiment Station at Rio Piedras, P. R.

The triple-threat mixture he describes will kill anything green that grows, but it can be applied close to the ground in plantings of bananas, coffee trees, sugarcane and pineapples in such a way that it gets on the weeds but not the leaves of the taller crop plants.

Science News Letter, April 10, 1948

ANTHROPOLOGY

Viking Medal Awarded to Harvard Anthropologist

➤ CITED as outstanding physical anthropologist of the year, Prof. Earnest A. Hooton of Harvard University was presented with the Gold Medal of the Viking Fund of New York and the Viking Prize of \$1,000 at the annual banquet of the American Association of Physical Anthropologists in Washington.

Science News Letter, April 10, 1948

INVENTION

New Telephone Machine Learns from Experience

➤ A MACHINE that can profit from experience has been invented.

It is a telephone switching machine developed by Phillips Gloie-lampen Fabrik in Eindhoven, The Netherlands. Usual switching machines go through the same blind search until the number which has been dialed is located and the call put through. But the new machine "learns" to distinguish frequently-called numbers from seldom-called ones.

When a number has been called frequently, the machine can make its connection more rapidly.

The new switching machine is similar in construction to an electronic computing machine. The invention can be applied to mathematicians' computing machines and to control devices such as the automatic plane pilot.

In a factory where machinery is run by control apparatus, the new machine would speed the most-used operations. And if new jobs were developed, the machine would learn these, too.

Studies of such machines also are underway in the United States.

Science News Letter, April 10, 1948

ANTHROPOLOGY

Geography May Influence Baldness in Young Men

➤ BALDNESS in young men seems to go by race, or perhaps by geography. At any rate, Dr. R. E. G. Armatoc of the Lomeshie Research Center, Londonderry, Ireland, stated in a report sent to the meeting of the American Association of Physical Anthropologists that he has found more young men with bald spots in Sweden than in France. While premature baldness in Sweden is commonest among educated men, Dr. Armatoc does not attribute it to excessive brain work.

This lack of hairiness in Sweden, however, works to the advantage of the opposite sex. Very few of the creamy-complexioned Swedish blondes have the hairy upper lips that often trouble their sisters in the British Isles.

"The need for the study of premature baldness from the point of view of occupation, etc., is self-evident, as many such men crowd hairdressing establishments in the hope of being cured," Dr. Armatoc pointed out. "Millions of dollars are spent each year in the vain attempt to regain lost youthful looks."

Science News Letter, April 10, 1948

BOTANY

Flowers Have New Faces

Superior flowers are produced by mutations, drugs, controlled breeding. Radiance cosmos is judged top winner of All-American Selection trials.

By MARTHA G. MORROW

See Front Cover

➤ THOSE new types of cosmos and petunias, marigolds and snapdragons you or your neighbor planted this winter or early spring already have an exciting history. Some have just had their lovely faces changed a bit, others have been completely remodeled. But all have been many years in the making.

The ancestors of some new flower types, like many people today living in the United States and Canada, came from such distant places as the Netherlands, India and Japan. Others may have developed from types that for centuries have been growing on American soil, but only recently have been painstakingly crossed because of certain desirable characteristics.

Descendants of Freaks

Some are the descendants of natural freaks, called mutations, that gave new and desirable qualities to the flowers. Still others may have been treated with a poisonous drug, colchicine, to produce more hardy varieties.

Professional breeders today are working on new flowers that you will not see for another five or ten years. Those types that first became available this year have been carefully nurtured for a decade or more.

The big news in flowers today is the Radiance cosmos, a real bicolor cosmos. Its blossoms are deep rose, with a wide central zone of crimson surrounding the yellow central disk. This flower is top winner of the 1948 All-American Selection trials.

A number of new flower varieties each year are entered in this contest. They are planted at a number of locations representing various climatic regions of the United States and southern Canada. A committee of qualified judges in each region observes these plantings and rates each new flower on its merits. The new Radiance cosmos was found different from other cosmos varieties and superior to them.

The story of this new flower begins a dozen years ago when a rare new cosmos was brought from India to the United States. This plant was a natural freak or sport from the tropical Indian cosmos.

In this country the plant grew tall and bushy, it bloomed late and sometimes not at all, and its flowers were small. But the blossoms had a distinct touch of crimson at the center—it was the first true bicolor cosmos ever found.

The plant was crossed with an early and low-growing cosmos type. The first and succeeding generations of the cross were selected for earliness of blooming, great size of flower, erect growth, long cutting stems and, of course, the unique colored center. After over a decade of careful selection, the Radiance cosmos just placed on the market this year was developed by Bodger Seeds, Ltd.

The Pink Sensation petunia, another All-American winner for 1948, is a first-generation hybrid. To develop it, a single dwarf petunia which had excellent coloring but not too satisfactory plant habit was crossed with another single dwarf compact petunia which was especially desirable in this respect.

To prevent self-pollination, all of the male parts of the first petunia were removed and the plant was pollinated by hand, using special pollen taken from the second petunia. The "mother plant" was then covered with a cheesecloth cage to keep insects away and prevent chance pollination.

Offspring Like Parents

The first generation offspring from this cross turned out to possess the desirable color of one parent and the desirable plant habit of the other. In addition, being a first generation hybrid, the offspring possessed more extreme vigor than either of the parent plants. The plants could be counted on for uniform growth, the flowers were larger and the blooming season slightly longer.

As an experiment, seed from this first generation was planted. The second generation plants lacked many of the fine qualities of the first generation, and in the third generation had deteriorated even further. It thus became evident

that to maintain the exceptional vigor and uniformity of the plant, only first generation hybrid seed could be used.

Consequently, the seed of the Pink Sensation petunia developed by the W. Atlee Burpee Company is a true first-generation hybrid. Every seed on the market today is the result of hand pollination and this process must be repeated each year.

Plant selection undoubtedly began thousands of years ago, before human beings were aware of the great changes that can be brought about in a flower or vegetable. Bees and other insects made the first selections by pollinating some flowers, missing others.

History of Breeding

Our early ancestors probably were too busy obtaining the bare necessities of life to pay much attention to plants that had only beauty to recommend them. When man first began to grow flowers, he transplanted entire clumps from the woods to his yard. It was only natural for him to choose the loveliest.

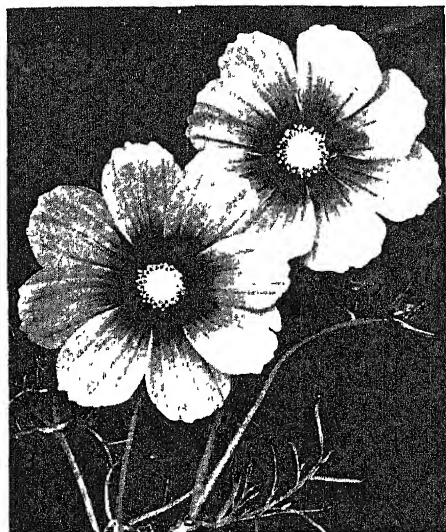
Today the breeding process is man-directed. Seed experts select the parent varieties with the desired characteristics and make the cross by hand pollination. They prevent chance pollination by bees and other insects.

A flower breeder, reports Dr. S. L. Emsweller, in charge of the floricultural investigations of the U. S. Department of Agriculture, usually has more than one aim when selecting plants for cross-breeding.

He may want more and larger flowers on taller, sturdier plants than any now grown. He may desire new and interesting variations in color, shape and petal formation. He may seek to extend the flowering season with early and late blooming varieties. Disease resistance is often a major goal.

Snapdragons, carnations and lilies for use in tomorrow's gardens now are being produced at the nation's great agricultural research station, Beltsville, Md. Remodeling a flower is a tedious, painstaking task.

If a new model in chrysanthemums is desired, for instance, all the varieties now available are first collected, explains Dr. Emsweller. The various chrysanthemum types are grown and studied for



RADIANCE COSMOS—Top winner of 1948 contest, this superior cosmos has deep rose blossoms, with a wide central zone of crimson surrounding the yellow central disk.

outstanding qualities. Those showing promise are crossed. First the tiny disk florets in the chrysanthemum center are removed, as shown on the cover of this week's SCIENCE NEWS LETTER, then they are hand-pollinated.

At present 50 new chrysanthemum specimens show some promise, but much work remains to be done. Only three or four will eventually turn out to be good and beautify your home.

Controlled breeding is a tricky process. The first step is to transfer pollen from the anthers or pollen-bearing part of the flower to the stigma or pollen-catching member of that flower or of one with which it is to be crossed. In some plants the pollen is produced by the same flower as the seed or by another flower on the same plant; in some the pollen must come from another plant. A plant that is to be self-pollinated requires but little special attention. In most cases the plant or its flowers can be enclosed in some sort of cloth, cage or paper bag to protect them from all pollen except their own. Some plants merely need to be shaken several times a day to scatter the pollen. Bees or flies must be introduced into the bag of others to secure the best pollination.

When one flower is to be crossed with another, every precaution must be taken to safeguard the stigma from all pollen other than that of the desired type. The plant's own pollen-bearing parts usually are removed before pollen is shed.

The anthers may easily be removed from such flowers as morning-glory, gladiolus and phlox. In these the pollen-bearers are large and easily distinguished. With other flowers it is more difficult to cut out the anthers without injuring the stigma.

With zinnias, asters, cosmos and other composites, where the male parts are so tiny they can be seen only through a magnifying glass, the task is made easier by the fact that the tiny florets are not all alike. Those that stand out around the flower like sun rays usually have seed-bearing organs but do not bear pollen. The tiny florets crowded in the center bear both pollen and seed—these complete florets are removed. The remaining ray-florets bear seed when pollen from another flower is introduced. In producing the first Radiance cosmos, this task was attempted many times before a cross was successful.

Care must be taken in cross-pollinat-

ing all flowers. The forceps or other tools used to cut away unwanted parts should be kept absolutely clean. They are often dipped into alcohol after each use so that no pollen will be carried from plant to plant. The camel's hair brush used in applying the pollen is also cleaned.

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Science Service Radio

➤ LISTEN in to a story of a Venezuelan expedition on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p.m. EST Saturday, April 17. Mr. Watson Davis, director of Science Service, will interview Dr. Dale Jenkins, member of a special technical mission connected with the Food and Agriculture Organization. Dr. Jenkins will tell about the vast untapped areas of palms from which edible oils could be commercially exploited.

Science News Letter, April 10, 1948

ASTRONOMY

To Measure Stars' Light

➤ AMATEUR astronomers of the future will not be satisfied with just telescopes, even relatively large ones. They will consider an instrument for accurately measuring the brightness of a star as necessary equipment, if they act on the suggestion of Dr. John S. Hall of Amherst College Observatory.

Each month thousands of useful observations of variable stars are made by amateurs. The value of this work can be greatly increased by a little extra equipment, Dr. Hall suggested. A light-sensitive instrument would take the guesswork out of such observations.

The photoelectric photometer is used with striking results by professional astronomers. A form of this instrument suitable for accurate observation of stars with a small telescope has been greatly simplified by war-inspired advances.

Dr. Hall spoke to amateurs attending the meeting of the Northeast Region of the Astronomical League. They had assembled in New Haven at the invitation of Dr. Dirk Brouwer, director of Yale University Observatory.

"The day is at hand when the amateur astronomer can attach a photomultiplier—weighing with its container no more than a few pounds—to his telescope," Dr. Hall pointed out. "He can carry this instrument to his backyard or to a nearby hilltop and make observations good to 0.01 magnitude."

The amplifier, meter and associated

batteries could be enclosed in a carrying case not much larger or heavier than a portable radio. The star-enthusiast would set this equipment on the ground, find the variable star in which he is interested and one or two stars of known brightness with which to compare it. These observations would be several times more accurate than if he had attempted to estimate their brightness by just looking at them through his telescope.

Dr. Hall and John F. Jewett at present are developing at Amherst College Observatory a compact, rugged amplifier for field use.

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PHYSICS of the 20th Century

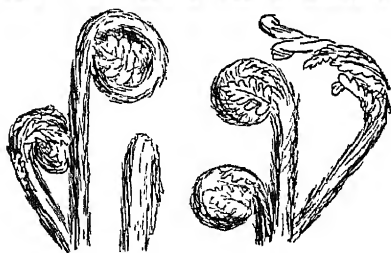
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Family Trademarks

➤ "FIDDLEHEADS" are the ferns' universal trademark. They all uncurl their new leaves in the same way, whether they are shy little wood-ferns in Nova Scotia or giant tree-ferns in New Zealand. Some botanists have likened them to bishops' croziers; this might do for the tree-ferns, but somehow for the smaller ferns of our own woods the more earthy name, fiddlehead, with its New England saltiness, seems more appropriate. They have fiddlers at Titania's court, but no bishops.

Not only does the main axis of a fern frond uncurl in this characteristic fashion, but the pattern is repeated in

EMBRYOLOGY

Study Pre-birth Patterns

➤ MAN is able to wink some six months before birth, although the wink "serves no immediate practical purpose."

This and other examples of how "amazingly early" behavior patterns are formed were given by Dr. Arnold Gesell, director of the clinic of child development, Yale University School of Medicine, at the Cooper Union Forum in New York.

Eight weeks after conception, when the human fetus is only one inch long, it responds to touch stimulation of the mouth region, Dr. Gesell stated.

"At 14 weeks it reacts with a patterned grimace; it is also able to swallow, to clasp its fingers, and to wink even though the eyelids are still fused and the wink serves no immediate practical purpose," he said.

At 20 weeks, when the future infant is only half way through its pre-birth development, it already has its full quota of 12 billion neurons, or nerve cells. "Intrinsic growth processes determine the

every detail of development. Every leaflet uncurls exactly as the main stem does, and if the leaf is doubly or trebly compound, as it is in many fern species, these subdivisions come out as smaller fiddleheads, repeating the parent pattern.

Ferns have a second family trademark, less conspicuous than the fiddlehead but no less characteristic and interesting. If you will look carefully at a fern leaf, after it is expanded, you will find that the veins do not form an irregular net, as they do in many seed plants, or run in close parallel lines, as they do in others, but always divide in a two-pronged forking pattern.

Characteristic as these two trademarks are of the fern family, they are not a monopoly. Both the uncurling of the leaves and the forked venation are found in the cycads, a very ancient group of seed plants now found only in the tropics and subtropics. Forked veins can also be seen in the flat, wedge-shaped leaves of the ginkgo tree, sole survivor of another very ancient family, now native only to China but planted to some extent in American cities. Existence of these fern-like characters in seed plants is generally considered to be evidence of the fern or fern-like ancestry of these forms, and through them the later-developed and more highly evolved seed plants generally.

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arrangement and relationships of these neurons, which in turn determine the forms and sequences of the eventual behavior," Dr. Gesell explained. "All this basic patterning, neurological and behavioral, is accomplished prior to and independent of experience. Such patterning operates not in utero, but throughout the whole postnatal cycle of mental growth, from germ to maturity. This is mental maturation."

Shakespeare's famous seven ages of man start with birth. Dr. Gesell presented seven developmental stages of human life as follows: "1. stage of the embryo, 0-8 weeks; 2. stage of the fetus, 8-40 weeks; 3. infancy, birth to 2 years; 4. the preschool age, 2-5 years; 5. childhood, 5-12 years; 6. adolescence, 12-20 to 24 years; 7. adult maturity.

"Man, of all creatures, has the longest period of relative immaturity. He is so complex that it takes him over 20 years to grow up, physically and mentally."

Science News Letter, April 10, 1948

Do You Know?

Calcium salts are an aid in preserving many fruits and vegetables.

The mineral *vermiculite*, used in lightweight concrete because it expands enormously when heated, makes a good bed in which to start seeds; plant food must be added because vermiculite contains no organic matter.

Trisodium phosphate, three pounds to a gallon of hot water, plus a cupful of ammonia, will remove old *whitewash* from a wall that is to be given a coat of paint.

The largest single source of American farm income is *milk*.

Recent advances in *fruit breeding* are partly due to exchange of new and old varieties between America and other countries.

TOXICOLOGY

1080 Poison Less Toxic to Some Birds than to Mammals

➤ THE sensationally successful poison for rats and other vermin, 1080, appears to be less toxic to certain kinds of flesh-eating birds than it is to mammals. This is a matter of considerable practical importance, since 1080 is used in control operations against small rodents that swarm on western rangelands, and also against coyotes; and useful predatory and scavenger birds might suffer secondary poisoning by picking up such poisoned animals, or by finding poisoned meat baits left for coyotes.

In tests conducted by the U. S. Fish and Wildlife Service, eagles survived doses of 1080 that were 22 times larger than the amount fatal to coyotes. Buzzards ate "unlimited quantities" of meat dosed with 1080 in five times the concentration customarily used on coyote baits. Magpies seem to be the only meat-eating birds likely to be endangered.

Baits of poisoned grain intended for rodents on the range are now dyed with bright colors. It has been discovered that seed-eating birds practically never touch grain of these "wrong" colors. Most of the lower mammals, including the rodents, seem to be color-blind; at any rate they pick up the poisoned grain without hesitation, no matter what its color.

Science News Letter, April 10, 1948

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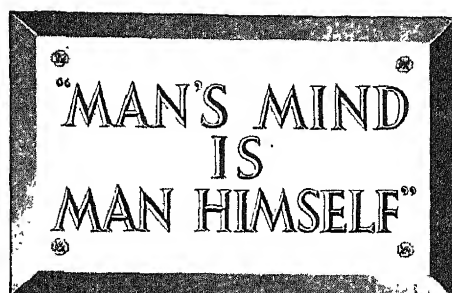
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GENERAL SCIENCE

Defend German Scientists

➤ GERMAN science leaders protected political suspects, including some of the few non-Aryans in Germany during World War II, by giving them work considered of "military importance," a famous German scientist asserted in defending his colleagues against charges of being "armorers of the Nazis."

Dr. Max von Laue, co-director of the Max Planck Institute and a leading anti-Nazi German scientist, described the "often fictitious" compliance of German science leaders with military demands in a communication to the *Bulletin of the Atomic Scientists* (April), published in Chicago. He objected to criticism of German scientists' role in the war, made by Dr. Philip Morrison, Cornell University physicist. Dr. Morrison had declared that German scientists, with a few exceptions including Dr. von Laue, had worked for the military in the war.

Pointing out that the directors of large German scientific institutions were forced to comply with Hitler's orders, Dr. von Laue told how some young specialists were protected from mobilization by larger research institutes.

"Sometimes too the possibility arose of protecting political suspects from con-

centration camps or worse, by assigning them research work of more or less 'military importance,'" he reported.

Some of these cases included non-Aryan Germans, the scientist declared.

Dr. von Laue, who discovered X-ray diffraction by crystals, was an outspoken critic of Hitler and maintained his friendship with Einstein and other German exiles at a time when this was considered treason.

Much work by German scientists during the war was not of a military nature, he emphasized, pointing out that many unpublished manuscripts of German wartime work in physics are concerned with scientific developments unrelated to the war.

In commenting on Dr. von Laue's criticism, Dr. Morrison replied in the *Bulletin* that "many of the most able and distinguished men of German science . . . worked for the advantage of the Nazi state."

Dr. Eugene Rabinowitch, University of Illinois scientist and co-editor of the *Bulletin*, commenting editorially on the dispute, warned that discrimination against German scientists makes the job of preventing future wars more difficult.

Science News Letter, April 10, 1948

METALLURGY

Strange Behavior of Metals

➤ VERY strange behaviors of metals and other substances near absolute zero temperature, approximately 460 degrees below the Fahrenheit zero, are described by Dr. S. C. Collins, of the Massachusetts Institute of Technology, in a recent issue of *Science* (April 2), official publication of the American Association for the Advancement of Science.

Electrical properties of metals at these low temperatures are discussed. When cooled to close to absolute zero they lose practically all resistance to electric currents. Dr. Collins also discusses a form of liquid helium that climbs up and over the sides of a glass flask holding the fluid.

More than a dozen laboratories in the United States are now actively engaged in researches which extend into the liquid helium range, he reveals. This is close to absolute zero. There were only two such laboratories prior to 1946, he said.

The initial interest in very low

temperatures was created chiefly by the desire to liquefy such gases as nitrogen, oxygen, hydrogen and helium. Helium, the last to yield, was reduced to a liquid state in 1908. It is the lighter-than-air, non-combustible gas used in American balloons, and employed also in medical work and as a shield in arc-welding.

The equipment used in some of the laboratories to obtain very low temperatures is a complicated machine called a Collins helium cryostat, designed by Dr. Collins. This makes it possible to obtain very low temperatures easier than could be obtained before. Helium is the working fluid, and 12 of these machines are now in use in the United States.

It has been known, since the discovery by Kamerlingh Onnes in 1911, that certain metals lose their electrical resistance when cooled to near absolute zero temperatures. Scientists say they then have superconductivity. A satisfactory complete theory of superconductivity has

not yet been advanced, Dr. Collins declares.

An electric current, once started in a superconducting circuit, continues to flow without help from an electric cell or other source of potential. Such currents may be started in a ring of the material by electromagnetic induction. Currents flowing in a superconductor are generally confined to a very thin surface layer.

There are two forms of liquid helium, known as Helium I and Helium II. The only unusual feature of Helium I is the

fact that its viscosity decreases as the temperature decreases. Helium II, however, has many strange properties. When an open thermos flask containing it is surrounded by a larger thermos vessel, the Helium II liquid quickly distributes itself between the two vessels, establishing the same level in both. The liquid seems able to flow over the retaining wall as if by a siphon. This ability of one form of helium to climb the walls of a container has already been used as a one-step process to separate the two forms.

Science News Letter, April 10, 1948

Books of the Week

TO SERVE YOU: To get books, send us a check or money order to cover retail price. Address Book Dept., SCIENCE NEWS LETTER, 1719 N St., N. W., Washington 6, D. C. In the case of free publications order direct from issuing organizations.

BREEDING LIVESTOCK ADAPTED TO UNFAVORABLE ENVIRONMENTS—Ralph W. Phillips—*FAO (Columbia University Press)*, 182 p., illus., paper, \$1.50. Concerned with the kinds of animals that thrive under harsh climatic conditions.

THE DIARY AND SUNDRY OBSERVATIONS OF THOMAS ALVA EDISON—Dagobert D. Runes, Ed.—*Philosophical Library*, 247 p., illus., \$4.75. Intimate glimpses into the daily life and thoughts of a great inventor.

ENCYCLOPEDIA OF HOME CARE AND REPAIR—William J. Hennessey and William W. Atkin—*Lantern*, 409 p., illus., \$3.95. If you want to know what is a gambrel roof, how to start a coal fire, or how to resurface a stucco wall with shingles, you will find the answers to these and many other questions all in alphabetical order in this book.

FUNDAMENTAL EDUCATION: Common Ground for All Peoples—Special Committee to the Preparatory Commission, UNESCO—*Macmillan*, 325 p., \$2.50. Here is not only stated the problem of world-wide illiteracy and ignorance, but methods are suggested for meeting it.

GEM TESTING—B. W. Anderson—*Emerson Books*, 256 p., illus., \$5.00. How to identify jewels, to distinguish one stone from another and the genuine from imitations.

GOOD NEWS ABOUT DIABETES—Herbert Yahraes—*Public Affairs Committee*, 32 p., illus., paper, 20 cents. Practical information for diabetics and their families and friends.

INTRODUCTORY PHYSICAL METALLURGY—Clyde W. Mason—*American Society of Metals*, 134 p., illus., \$3.00. Lectures before the ASM.

MASONRY SIMPLIFIED, VOL. I: TOOLS, MATERIALS, PRACTICE—J. Ralph Dalzell and Gilbert Townsend—*American Technical Society*, 367 p., illus., \$4.50. Of interest to homebuilders and architects as well as the workmen for whom it is intended.

MASONRY SIMPLIFIED, VOL. II: PRACTICAL CONSTRUCTION—J. Ralph Dalzell and Gilbert Townsend—*American Technical Society*, 405 p., illus., \$5.00. Covering all sorts of construction from chimneys to septic tanks and including ratproofing,

termite protection and other items important to the home planner.

PRECISION INVESTMENT CASTINGS—Edwin Laird Cady—*Reinhold*, 356 p., illus., \$6.00. Describing for the benefit of engineers a relatively new method for making parts and semifinished or finished products economically.

STRANGE PREHISTORIC ANIMALS AND THEIR STORIES—A. Hyatt Verrill—*Page*, 262 p., illus., \$3.75. Not intended as a scientific book, the purpose is rather to entertain with stories of the amazing creatures who walked this earth in times gone by.

TRIBES OF THE LIBERIAN HINTERLAND—George Schwab—*Peabody Museum*, 526 p., illus., paper, \$7.50, cloth \$10.00. The report of the Peabody Museum expedition to Liberia.

TWELVE WALKED AWAY—Marguerite Gaylord Tate—*Harcourt, Brace*, 150 p., \$2.50. The interesting narrative of an airplane crash in the Swiss Alps and the rescue.

USING SALTY LAND—H. Greene—*FAO (Columbia University Press)*, 49 p., paper, 50 cents. Telling how to reclaim much land not now useful for agriculture.

VITAMINS AND HORMONES: Advances in Research and Applications, Vol. V—Robert S. Harris and Kenneth V. Thimann, Eds.—*Academic Press*, 478 p., illus., \$7.50. Another in a series of critical reviews in this important field.

Science News Letter, April 10, 1948

BIOLOGY

Nobody Eats Terrapin Now, So Breeding Project Ends

➤ **TERRAPIN** in North Carolina waters—2,600 of them—are being put out on their own. They have been spoon-fed all of their lives—and some of them are up to 50 years old—but from now on they must forage for themselves.

The 2,600 diamondbacks represent the

last of the breeding stock used in a joint federal-state project to restore these gourmets' darlings, sadly depleted by decades of too-intensive hunting.

The project has been measurably successful, with a total of a quarter-million young terrapin restocked into waters along the South Atlantic coast.

Of late years the demand for terrapin has fallen off considerably. Congressional appropriations have ceased. So the breeding colony at Beaufort, N. C. will be turned loose to hunt for their own grub.

Science News Letter, April 10, 1948

CHEMISTRY

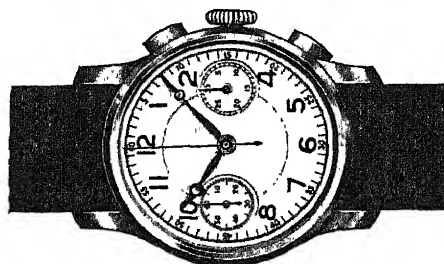
Citric Acid Made from Milk in New Process

➤ **CITRIC** acid, the acid of lemons and oranges, is made from milk in the process on which Joseph Szucs of Yonkers has received patent 2,438,136. He feeds a suitable mold on a solution of dried skim milk plus necessary mineral elements, and the mold secretes the acid.

Science News Letter, April 10, 1948

A trace of *copper* in stock feed has been found beneficial.

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☼ **PUSH TOOL** for the gardener has a single straight handle and rolls on a corrugated cylinder. It marks rows the desired distance apart, digs seed furrows the proper depth, and automatically covers the seed with earth. Attachable tines convert it into a cultivator.

Science News Letter, April 10, 1948

☼ **FINGER RING**, recently patented, permits the interchange of gem stones. The socket that holds the jewel has resilient detents, or holding devices, and lugs which permit the stones to be removed.

Science News Letter, April 10, 1948

☼ **LETTERED SIGNS** are quickly and accurately set by use of card-board-backed acetate letters and a composing stick in which the letters may be placed. After a line of letters have been set, transparent Scotch tape is laid over them. By this means the line may be removed.

Science News Letter, April 10, 1948

☼ **ELECTROMAGNET DEVICE**, home-built by one factory for first-aid treatment, removes metal splinters accidentally embedded in the arms or face of a machine operator. By means of a coil approximately a foot long, the magnet has strength to remove three-inch splinters.

Science News Letter, April 10, 1948

☼ **AUTOMOBILE SEAT COVER**, made of a special fabric, can be cleaned of grease daubs, such as shown in the picture, by a damp cloth or a soapy sponge. The fabric is also fire-resistant.



It is of rayon, cotton or glass fiber, coated with plastic solvents and resin.

Science News Letter, April 10, 1948

☼ **STAIR COVER** is a rubber mat shaped to lie on the horizontal stair tread, fit snugly the projecting edge and cover the riser. A groove in the outer surface of this recently patented covering permits close fit in the angle between tread and riser.

Science News Letter, April 10, 1948

☼ **PAPER-LIKE MATERIAL**, for electrical insulation, is made of almost pure asbestos and a mineral binder. It will not burn at any temperature nor is it affected by time and most chemicals. It can be processed into very thin sheets.

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Question Box

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How are superior flowers produced? p. 234.

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GEOLOGY

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THE WEEKLY SUMMARY OF CURRENT SCIENCE • APRIL 17, 1948



Neandertal Haunt

See Page 243

A SCIENCE SERVICE PUBLICATION

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ANTHROPOLOGY

Neandertal Man in Africa

Fragments of human fossils discovered in a cave in North Africa prove that this extinct race was not confined to Europe and Asia, as previously believed.

See Front Cover

➤ NEANDERTAL hunters, the low-brows of the Old Stone Age, prowled North Africa while Ice Age glaciers held most of northern Europe in their cold grip. Evidence of the presence of Neandertal man in Africa has been discovered in a cave near the north-western corner of that continent by an expedition under the direction of Dr. Hugh Hencken, director of the American School of Prehistoric Research at Cambridge, Mass.

The cave is one of a group known as the Caves of Hercules, because of their proximity to the traditional Pillars of Hercules, on the Strait of Gibraltar. Human fossils were limited to several teeth and part of the upper jaw of a Neandertaler. These, with similar fragments found at Rabat in French Morocco by French scientists, constitute the first proof that Neandertal man ever lived in Africa. Previous finds of this extinct race have been confined to Europe and Asia.

Another race of prehistoric hunters who occupied the cave during the Ice Age have been given the name Aterians. With beautifully flaked weapons of flint they hunted such game as elephant, rhinoceros and giraffe, now wholly unknown in this part of Africa. Reason for their presence some 75,000 years ago is that while the glaciers occupied much of Europe the climate of North Africa was much more humid than it now is, so that vegetation capable of supporting such big game could grow in what eventually became semi-arid and even wholly desert land.

Neandertalers and Aterians were not the first human occupants of the land. Dr. Hencken and his colleagues found crude stone handtools indicating the presence of a primitive human population as much as 150,000 years ago, during a warm interlude in the Ice Age when sea level was 60 feet higher than it now is. No skeletal remains have been found of these earlier peoples.

The Aterians were eventually displaced by a new invasion from the East, some 5,000 or 6,000 years ago. These

newcomers were no longer hunters, but a farming and pastoral people, believed to be the ancestors of the Berbers now found in the area.

On the cover of this week's SCIENCE NEWS LETTER are shown Prof. Carle-

BIOCHEMISTRY

Steps in Photosynthesis

➤ ALL chemical steps in photosynthesis, fundamental food-making process in green plants, are now believed to be known, thanks to the use of radioactive carbon as a tracer element. Dr. Melvin Calvin, University of California chemist, reported in a lecture at Western Reserve University in Cleveland.

Working with Dr. Andrew Benson, Dr. Calvin recently identified the last two intermediate compounds prior to sugar formation as phosphoglyceric acid

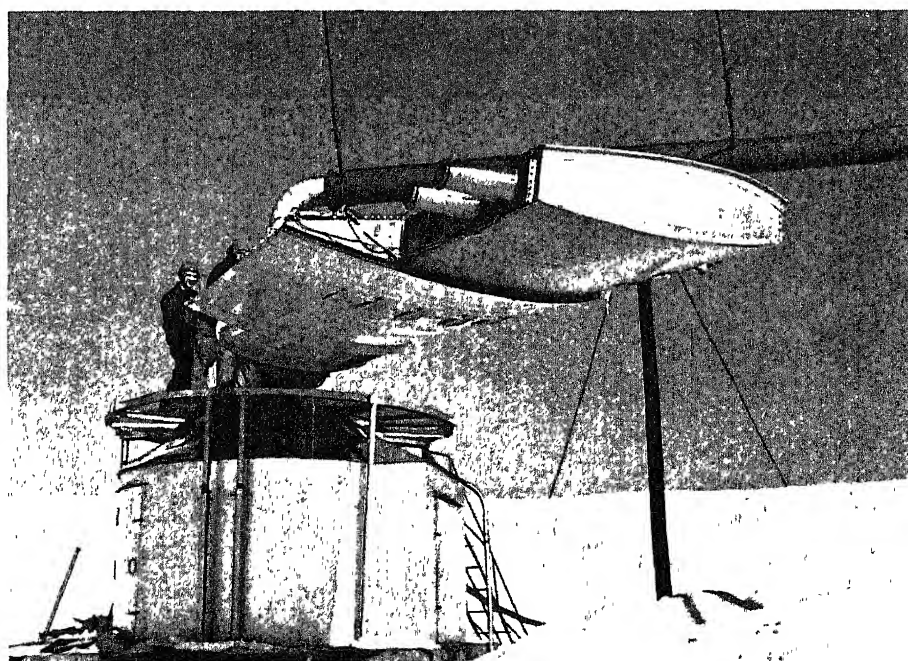
ton S. Coon of Harvard, a member of the expedition, and his Arab assistant, Mustapha. They are digging for remains of Neolithic man in one of the caves.

The American School of Prehistoric Research occupies quarters on the Harvard University campus, and its director, Dr. Hencken, is also curator of European archaeology in the University. The work of the School in Europe, Asia and Africa has been supported in part by grants from the Viking Fund and from the American Philosophical Society.

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and triose phosphate. The latter is itself a simple sugar.

Last year, the Berkeley scientists demonstrated that intermediate products in photosynthesis include amino acids, which are building-blocks of proteins; other organic acids such as succinic, fumaric and malic; and neutral sugars. Compounds unidentifiable at that time turned out to be the two reported by Dr. Calvin now. He said that the biggest problem now confronting scientists in



HELICOPTER JETS—Jet propulsion for helicopters uses small jet engines on the rotor blades that give lift and forward motion to the aircraft. They are being tested for the U. S. Air Force by General Electric engineers at Schenectady. The first Air Force rotary-wing aircraft to use a jet power plant, is the McDonnell Little Henry, flight-tested in May 1947.

Linlithgow Library.

this field is the explanation of how light is utilized by plants to bring about known transformations. One possibility is that light and chlorophyll set free hydrogen atoms from water in the plant. Then a catalyst, such as a co-enzyme, does the job of combination.

He stated that some of the intermediates in photosynthesis are identical with compounds formed by the same plants, but so far it has been proven impossible to distinguish early intermediates in photosynthesis from fermentation products. But more advanced intermediates can be identified by the positions of radioactive carbon atoms in their molecules, since such carbon atoms reach po-

sitions in these molecules that are impossible to reach by fermentation.

The experiments were performed both in darkness and in light. Pre-illuminated plants exposed to radio carbon in darkness were able to form the same intermediate compounds as plants given 30-second exposure to radioactive carbon in light. Dr. Calvin said that this research further confirms the previous theory that photosynthesis is the reverse of respiration in plants and animals. Intermediates formed in photosynthesis are the same as those formed when animals break down sugars to form carbon dioxide and water but in reverse order.

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PUBLIC HEALTH

WHO Contributor to Peace

U. S. apparently to play only observer's role when full-scale activities begin with the meeting in June of the World Health Assembly.

➤ AN important aid to world peace in which the United States seems destined to play only an observer's role is the forthcoming World Health Assembly, scheduled to meet in Geneva, Switzerland, in June of this year.

The World Health Assembly will mark the beginning of full-scale activity of the World Health Organization. The Soviet Union has become the 24th of the necessary 26 members of the United Nations to join WHO, and two more seem assured. The United States will not be one of them unless the Rules Committee of the House of Representatives reverses its recent action in tabling indefinitely the bill that would enable us to join WHO.

The World Health Assembly will be the first in a series of annual assemblies "which can be an important focus of the world's hope of peace and life," Dr. H. van Zile Hyde, alternate U. S. representative to WHO's interim commission, declared in a recent State Department Bulletin.

The International Health Conference which laid the plans for WHO and the successful course of its interim commission, he said, "have confirmed the historical fact that in the field of health nations can meet together in a spirit of friendship and understanding, and arrive at firm decisions which are carried through to an effective conclusion for the betterment of mankind."

Examples of accomplishments ex-

pected through WHO, and already begun under its interim commission, are found in malaria control, tuberculosis control and improvement of the mental and physical health of the world's children who are its future citizens and potential war or peace makers.

Malaria, which affects the world's food supply as well as its health, can be controlled "even to the point of eradication," Dr. Hyde declared. "What is required is the extension of knowledge and provision of leadership to affected areas. In Greece, for example, where through the centuries malaria has annually attacked 1 to 3 millions of a population of 7.5 million, the disease has been reduced to a minor problem—by Greeks—under the leadership of a handful of experts sent into the country by UNRRA and maintained there now by WHO's interim commission."

On tuberculosis Dr. Hyde declared that, internationally, the final conquest of this great plague is "in the hands of the United Nations itself and those of its specialized agencies concerned with world economic health. Tuberculosis is a disease that can be suppressed by a planned attack. The low death rate of 32 per 100,000 in Denmark, as contrasted with rates of 200 to 400 per 100,000 in several other areas of Europe, is a direct result of such attack.

"The interim commission has recognized that the WHO can contribute significantly towards its control through

the extension of professional knowledge by fellowships, demonstrations and expert advice to governments, through the extension of public knowledge concerning the disease and its method of spread; by the promotion of the eradication of tuberculosis in cattle and particularly, now, by the extension of the use of BCG vaccine.

"The commission has not felt it prudent to wait for the WHO in order to extend the use of BCG vaccine in areas in which tuberculosis is epidemic. It is therefore sending teams to India, at the request of that government, to demonstrate the technique of vaccination in the hope of extending its use there on a wide basis. At the same time it is providing to the International Chil-

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dren's Emergency Fund a panel of experts to advise the Fund on the technical aspects of a program upon which the Fund is embarking to vaccinate an estimated 15,000,000 children in Europe.

MEDICINE

Nose Remedy Tests Urged

Cites examples of damage to lining of nose and sinuses and brain in warning against premature use of new medicines.

► PATIENTS pay through the nose, literally, for sinus and other nose medicines when these are used without first being tested in the noses of animals, Dr. Noah D. Fabricant of Chicago charged at the meeting in Atlantic City of the American Laryngological, Rhinological and Otological Society.

"Knowledge of undesirable caustic reactions (of such drugs) sometimes comes initially via the patient's nose," he declared. "If the truth be stated bluntly, this is literally paying through the nose."

Two cases of chemical meningitis following irrigation of the nasal sinuses with thyrothricin, one of the penicillin-like drugs, have recently been reported. The disease process was recreated in animal experiments, "an example of closing the garage doors after the automobile had been stolen," Dr. Fabricant commented.

Years after nose and throat specialists had "liquidated" mercurochrome by the trial and error method on patients, it was discovered that when the chemical is put in the noses of experimental animals it passes, in much less than two hours, through the linings of the nose and sinuses, the bony walls of the frontal sinus and even through the covering of the brain to stain the cortex of the brain itself.

"Wild exaggerations" were made a few years ago for a highly alkaline solution of a sulfa drug, sodium sulfathiazole, for local treatment of chronic sinus trouble. Then it was discovered that the medicine was extremely caustic to the lining of the nose and sinuses and damaging to the little hair-like processes inside.

Besides making sure the drugs they use have been thoroughly tested, Dr. Fabricant reminded nose and throat specialists that in choosing a medicine for their patients they need to consider the season of the year. The differing degrees of virulence of germs and the

The Commission has, as well, accepted the responsibility for conducting studies to determine the effect on tuberculosis rates of this vast vaccination program."

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possibility of bacteria having undergone metamorphosis must be taken into account. The pattern of nose and sinus infections changes from year to year, so the medicine that was helpful one year may not remedy sinus infection in the same patient the next year.

Penicillin and sulfa drugs used in the nose for the most part do not help in long-standing chronic sinus infections. This, Dr. Fabricant explained, is because the linings of nose and sinuses have become so thickened and tough the drugs cannot get through to hit the germs. In some cases of acute infection he considers penicillin and other antibiotics are "of minor help."

A "crying need" exists for new medicines to shrink the blood vessels and swollen tissues of stuffy noses in colds and sinus infections. If they can be produced in combination with one of the newer penicillin-like drugs, so much the better. But Dr. Fabricant thinks existing nose medicines combining sulfa drugs or penicillin with a chemical to shrink the swollen tissues bring relief primarily because of the shrinking chemical. The sulfa drug or antibiotic addition serves actually, in his opinion, as "a talking point."

Penicillin or other medicated throat lozenges are of doubtful value. The explanation Dr. Fabricant gave is that the germ-stopping chemicals do not get far enough back into the throat in sufficient quantity, and when the chemicals do reach the tonsils, they stay on the surface without getting at the germs within the tonsils.

Giving anti-germ chemicals by another method, insufflation, however, seems to help in some cases of sore throats. But no matter how the drugs are applied, he pointed out, so much will be washed away from tonsils and throat by the saliva that an effective concentration cannot be kept for long.

Use of sodium bicarbonate and other alkalies for prevention or treatment of colds has become a part of American folklore, but is of no value. The normal human throat is either on the acid side most of the time or slightly alkaline in limited instances, Dr. Fabricant's studies show. Consequently trying to "alkalinize" it is trying to reverse the normal state instead of trying to get back to it.

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CHEMISTRY

Viscose Rayon Does Not Absorb Dye Uniformly

► VISCOSE rayon, the kind used in most rayon dresses and shirts, does not absorb dye at a uniform rate. The core of the fibers usually takes up the dye more quickly and loses it more easily than the skin.

In a cross-section of ordinary tire-cord yarn stained with Solophenyl Fast Blue Green BL dye the core is completely colored, but dye has not yet penetrated the skin.

But after dye such as Victoria Blue, used in preparing the rayon fibers, had penetrated both the core and the skin,



RAYON DYE PROCESS—These are cross-sections of rayon fibers showing, on the left, that the core absorbs the dye before the skin, and, on the right, that dye washes out of the core more quickly than from the skin.

the rayon skin is more intensely colored. The fibers were first permitted to take up all the dye they could absorb, then washed in alcohol to bleed out some of the dye. They were dried after all color had bled out of the core, but before much had been lost from the skin. Then an end-on view of the fibers was photo-

graphed.

The specimens were prepared by Dr. P. H. Hermans, director of the Institute for Cellulose Research, Utrecht, The Netherlands. Full details on staining viscose rayon fibers are given by Dr. Hermans in the *Textile Research Journal* (Jan.).

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GENERAL SCIENCE

Plan Tri-State Project

Educators meet to formulate plans for the development of Louisiana, Mississippi and Arkansas so that brains, brawn and raw resources be better utilized.

► THERE are raw materials, good rich soil, plenty of sunshine and human brawn and brains in the area of the Middle South on both sides of the lower Mississippi river.

The brains of this area are going to do something about making Louisiana, Mississippi and Arkansas more useful to the nation and to the peoples of these three states.

The leading educators—college presidents and research directors—of these three states sat down together when Greenville, Miss., cotton town near the junction of the three states, welcomed politicians, industrialists, and others to dedicate a new tri-state drive powered by the public utilities of the region. It was the first time the educators have seized the opportunity to start pulling together on the major problem of meshing the colleges and laboratories with industries and agriculture into the daily life of the region.

One of the principal exports of this region to the North consists of human beings. Population flows out of the area, along with other raw materials such as cotton, sugar, rice, tung oil, shrimp, petroleum, natural gas and other products.

But the major export of population—human beings who move north for better opportunities—consists largely of unskilled labor. This Middle South is actually an importer of professional and managerial people. Educators at the Greenville meeting were told this is a real problem. And the youth of the area who are educated in the area or who go to the Eastern colleges for advanced study are likely to get sucked away to other more aggressive regions.

Cultivation of brains, in the fields of science, technology and social applica-

tions, is a prime objective of the tri-state educational council formed under the chairmanship of President Rufus C. Harris of Tulane University.

In the long haul, this is deep plowing for the solution of agricultural problems, dispersed small industries using the raw materials available, and chemical processing of the oil, gas, sulfur, minerals, etc.

GENERAL SCIENCE

Work or Fight in Next War

► IT will be work or fight for all of us in the next war, with expected civilian casualties running so high that large numbers of doctors must be kept at home to care for them. This is the picture drawn by Army, Navy and civilian medical authorities at the meeting of the Council on National Emergency Medical Service of the American Medical Association in Chicago.

"Every ounce of available manpower will be needed," Rear Admiral Morton D. Willcutts declared. "Selective Service rejections during the last war at times exceeded 40% of those registered. That won't do in the next war.

"Those with chronic diseases, even of the psychiatric type, must find their stride and fight or work," he warned.

The Pearl Harbor blow of the next war, he forecast, will come as a special weapon for mass destruction. Whether this will be an atom bomb, a chemical agent or some unnamed weapon he said was beyond his province to name. But the death rate, he declared, will be "appalling" and the question of disposal of the civilian dead will be formidable. The new weapon will leave persistent agents of destruction so that to re-enter or ap-

proach them will be dangerous. Already science has remade practices and methods on the Mississippi delta. Sugarcane would be nearly extinct if breeders had not been successful in remodeling this plant to resist the blight. Good beef cattle are raised, thanks to such new tricks as liming the soil, year-round grazing and feeding on dehydrated sweet-potatoes.

Diseases have been conquered in the region and as a result of medical research better health has flowed to other parts of the nation and the world.

Research is an important activity in these three states. Textile developments are a prime interest of the U. S. Department of Agriculture's Southern Regional Laboratory. The technique of controlling unruly rivers is practiced on the great Mississippi by Army engineers.

But the educators of these three states see the need of more research, more graduate schools, more trained brains—and they want to start down at the "grass-roots" in the homes and the schools where boys and girls get their basic education and develop directions for living.

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proach them will be dangerous.

A total of 116,000 physicians, or one to every 1,250 of the civilian population, is the civilian medical manpower need expected to be recommended by the American Medical Association's council.

These must be "effective, able-bodied practicing physicians," it will be stressed. This is the number that will be needed to maintain civilian medical care and treatment during all phases of national emergency, and for continuing medical education and research programs.

The medical association is also expected to recommend that under a temporary draft or UMT the younger physicians who have not had military service as medical officers should be called first. The recommendation will also probably state that physicians within the military age limit requirements who have had no military training should likewise be called.

Advice on this problem of how to bring the Navy medical corps up to strength was asked of the association by Admiral Willcutts, speaking for the Navy's Bureau of Medicine and Surgery.

Only eight of the 48 states, Hawaii, the Panama Canal Zone, Virgin Islands

and the District of Columbia have state disaster relief programs in effect, Dr. Richard A. Meiling, of Ohio State University, reported. As secretary of the AMA National Emergency Medical Service Council, he requested this information two months ago from all states

and territories. Answers were received from 37. None of the eight with programs in effect nor any of the others with programs in the planning stage have included a medical adviser from the state medical association.

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MEDICINE

Clue to Artery Damage

Mechanics of damage from large fat particles explained. They are trapped in artery walls by scavenger cells. Years of this thickens and hardens arteries.

➤ ONE kind of artery disease results from the simple, well-known fact that oil and water do not mix.

The artery disease is known to doctors as atherosclerosis. It is a fatty degenerative kind of arteriosclerosis, hardening of the arteries to you.

The mechanics of how it develops, beginning with the difficulty of mixing oil and water, have been worked out by Dr. John E. Moreton of Salt Lake City.

Because oil and water do not mix, the fats and oils in blood plasma, which is about 90% water, must be carried in a special form, Dr. Moreton explains in a report to the journal, *Science* (April 9).

The fats from food that get into the blood via the intestines are not carried in the same finely divided state as fatty materials normally in blood plasma.

When a man eats about two ounces of butter fat, a shower of these big fat

particles descends on his blood stream about four hours later. Reporting this finding last fall, Dr. Moreton said that the size of these fat particles gave a clue to how artery damage could result from fat-rich meals eaten over a period of many years.

Today Dr. Moreton gives more links in the chain leading from many fat-rich meals to artery damage. When the big fat particles get into the innermost part of the artery, it is a signal for certain body cells to go into their primitive scavenger act by which they protect the body against disease germs and other harmful substances. These cells arrest, engulf and trap the big fat particles, holding them in the artery walls.

By gradual, infinitesimal stages, the trapping of big fat particles thickens and hardens the artery walls to the point where the bore of the artery is closed and blood cannot get through.

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the course of the cancer in animals untreated. But if the ancestors of these untreated animals had been exposed to radioactivity through living in the laboratory where the chemicals were being tested, they would not give an accurate control to compare with the treated animals.

Besides excluding all radioactive isotopes or animals treated with them, the Jackson Laboratory will have special isolation rooms and units where any chemicals with cancer-causing properties will be used.

The laboratory, long famous for its specially bred strains of animals for cancer and other research, is now conducting a drive for additional funds to rebuild the laboratories and re-establish the animal colonies that were largely destroyed by forest fire last fall. The drive is to meet the present emergency, it was pointed out. It will not be an annual one, and is not in competition to the current drive of the American Cancer Society which conducts an annual campaign for cancer-fighting funds.

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GOURMET'S DARLINGS — Ordinarily shy, and inclined to race for the water when humans approach, when the terrapin once digs a nest, she will not leave until she has carefully covered and camouflaged her eggs. Nest is ingeniously covered so that air pocket remains, preventing eggs from spoiling. Spoon-fed for years in North Carolina waters under a joint federal-state project, terrapins are now being put out on their own. (See SNL, April 10.)

MEDICINE

Radioactive-Free Oasis

➤ A LITTLE world where there will be no dangerous radioactivity, no atomic bomb by-products, is now being created. It will be peopled by highly pedigreed mice, rats, rabbits and guinea pigs. But humans exposed to dangerous radiation at work or in any future atomic bombings will benefit.

The radioactive-free oasis is being established at the Jackson Memorial Laboratory at Bar Harbor, Maine. Its unique reversal of present trends at medical research laboratories was announced by its director, Dr. Clarence C. Little, at the laboratory's emergency committee headquarters in New York.

"Our object is to develop for research throughout the United States, Canada and Europe a source of experimental

material which at any time can be guaranteed to be a normal control population for a group of animals being used elsewhere," Dr. Little stated.

Radioactivity can permanently change living cells, among them the reproductive cells from which all future generations are formed. In order to understand such changes, to foresee them, to prevent, direct or evaluate them it is absolutely essential to have control animals completely isolated from any source of radioactivity or atomic energy. Radioactive isotopes are now being used in more and more laboratories in a search for cancer cures and in a search for better means of fighting atomic energy damage.

Results of use of a radioactive chemical in cancer must be compared with

VETERINARY MEDICINE

**Calves Blinded, Crippled
By Lack of Vitamin A**

➤ TWO new vitamin-deficiency diseases in cattle have been discovered by Dr. Lane Moore of the U. S. Department of Agriculture. Both affect calves, and result from lack of vitamin A, either in the diet of the cow before calving or in the diet of the calf itself immediately after birth.

The first malady is an overgrowth of spongy bone in the skull, especially around the eye-sockets. This closes the channel through which the optic nerve passes from the brain to the eye, pinching off the nerve and causing total blindness.

The other result of vitamin A lack is an increase in the pressure of the spinal fluid to as much as six times normal. This destroys the calf's ability to coordinate its muscle movements. If the affected animal is given vitamin A, its spinal fluid pressure slowly returns to normal and muscular control is restored.

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AERONAUTICS

**"Package" and Power
Give Jets High Speed**

➤ AN airplane's speed is due to the power you can put into the engine, plus the smallness of the "package" you can wrap that power up in, two aviation engineers explained.

Reinout P. Kroon, engineering manager of the Westinghouse Aviation Gas Turbine Division in Philadelphia, and Winston R. New, manager of the Laboratory, discussed the principles of jet propulsion as guests of Watson Davis, director of Science Service, on Adventures in Science heard over the Columbia network.

Jet engines are suitable for high speed because they are very small, light and simple for their power. That is one of the reasons for their terrific speed, the engineers stated. Smallness is essential to speed because it reduces the frontal or so-called "barndoor effect" you get in pushing a piston engine through the air at high speed.

"With modern jet engines, this saving in frontal area is so great that a single engine can give the power that it would take conventional engines with ten times the frontal area to produce," Mr. Kroon declared.

The other reason for the speed of a jet engine is the fact that the faster a jet-powered plane goes, the more power

its engine produces. That is why a jet engine has virtually no power limitations—its thrust power goes up constantly as the plane goes faster. A piston engine, on the other hand, produces relatively constant horsepower, no matter what its speed.

Five years from now, engines may be built powerful enough to drive airplanes at 1,400 miles per hour, the engineers predicted. That will leave it up to plane designers to plan an airplane that can hold the engine, they concluded.

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GEOLOGY

**Glaciers' Autographs
Are Collected by Briton**

➤ GLACIERS' autographs are being collected by a London scientist, Dr. G. Seligman of the British Glaciological Society. The procedure is very simple: he holds a sheet of paper against a smooth surface on the ice and rubs it with a soft pencil, bringing out the pattern of the ice crystals beneath.

He finds that the crystals are "surprisingly small," particularly where the ice is actively flowing. There also seems to be some relation between the crystal size and the steepness of the glacier bed.

Dr. Seligman invites persons who have glaciers available to cooperate with him in this new type of study.

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PLANT PATHOLOGY

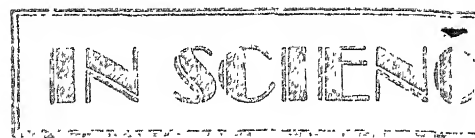
**Replanting of Elms To Be
Tested in New England**

➤ WHETHER young elm trees can profitably be planted where the Dutch elm disease has destroyed their predecessors is to be tested in New Haven in a cooperative test that has been planned by the Connecticut Agricultural Experiment Station and the New Haven Park Department.

About 250 young trees will be set out. Part of them will be supplied with water containing a chemical, oxyquinoline benzoate, which is claimed to be effective against the disease-causing fungus. Several different groups will be treated with DDT sprays, on various schedules. One group will be left untreated, as controls. Full answers are not expected for several years.

Dutch elm disease, incidentally, is a misnomer. The elm-killing fungus did not originate in the Netherlands, and did not come to the United States from that country.

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PSYCHOLOGY

**Superstition in Pigeons
Developed by Experiments**

➤ THE superstition that makes a card player get up and walk around the table to "change his luck," can be produced experimentally in pigeons. The "superstitious" birds were developed by Dr. B. F. Skinner, psychologist at Indiana University, Bloomington, Ind.

These birds go through all sorts of strange rituals even more elaborate than that of a baseball pitcher. One goes running wildly around his cage—always in the same direction. Another pokes his head into one of the upper corners of the cage. Another acts as if he were trying to toss something with his head. Two birds swing their heads and bodies in a sort of pendulum motion.

It was fairly easy, Dr. Skinner found, to teach the pigeons to trace their luck to such absurd gestures. All he had to do was to rig up a clock to give food to the birds at regular intervals, entirely regardless of what the bird is doing at the moment. The bird, who is ravenously hungry, tends to repeat rapidly whatever he was doing when the food arrived.

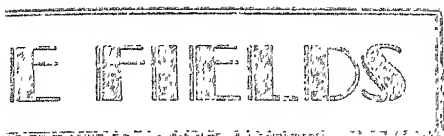
The trick in setting up the "superstitions" was just to set the clock to give food at frequent intervals. If a bird is swinging his head and gets a seed, and then he is given another seed after a few seconds, the chances are he will be swinging his head when the second one arrives. Like the card player, who interprets this as a "run of luck," the bird learns to repeat his gesture.

If the clock were set slower, however, there would be less "superstition" because the chances would be greater that the bird would be in a different part of the cage doing something altogether different when the second seed came.

Fifteen seconds, it was found, is an effective timing for producing superstitions; one minute is too long. Once the superstition is set up, however, the time can be lengthened. One bird was kept repeating this absurd gesture for many hours with a one-minute interval between rewards.

Dr. Skinner describes his superstitious pigeons in the *Journal of Experimental Psychology* (April).

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BIOCHEMISTRY

Penicillin Makes Germs Prisoners, Study Shows

➤ WHY sodium penicillin is so deadly to germs has been discovered by Prof. Ernst A. Hauser, of the Massachusetts Institute of Technology, Cambridge, Mass.

Contrary to former opinion, sodium penicillin when dissolved in water does not form a true solution but a colloidal solution, a sort of finely divided jelly. Penicillin dissolves in the blood stream and coats the germs with an impenetrable layer of colloid. Trapped in this jelly, the germs find themselves prisoners, unable to move, to forage for food, to multiply.

In a study of the chemical behavior of this very important drug, Prof. Hauser and his co-workers found that sodium penicillin markedly reduces surface tension, that is, it acts in the same way as a soap.

Looking at the solution through an ultramicroscope, they noticed that the more potent the drug was in action, the more finely divided it appeared. When this test is applied to determine the potency of penicillin, it will be possible to give patients smaller but more effective doses.

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BOTANY

Mushroom Soup Prepared From Asparagus or Pears

➤ MUSHROOM soups, and other mushroom-flavored gourmets' delights, can be produced without having the actual mushrooms, out of the supporting thread mass, or mycelium, of mushrooms grown in a liquid medium made of such cannery wastes as asparagus butt juice or press juice from pear waste, supplemented with certain mineral salts.

This suggestion for the possible utilization of cannery wastes, which makes it possible to dispense with the increasingly scarce horse manure that has long been the mushroom-grower's standby, is offered in *Science* (April 9) by Dr. Harry Humfeld of the U. S. Department of Agriculture, who carried out his experiments at the Western Regional Research Laboratory in Albany, Calif.

He inoculated the cannery-waste nutrient media with mushroom threads obtained from a commercial mushroom grower, and let them grow until a sufficiently massive matted clump had developed. He got rid of the culture fluid by centrifuging and washing, then froze and dried the mycelium. He found the flavor satisfactorily "mushroomish", so that the material was suitable for soups, gravies and similar purposes, though of course not for dishes requiring mushroom caps or buttons. Chemical analysis showed a close similarity to ordinary market mushrooms.

One beauty of the new technique is the rapidity with which new growth can be obtained, once a sufficient mass of mycelium has been built up. Half the growth can be harvested, and in 12 hours the same quantity can again be removed, and so on indefinitely so long as fresh nutrient juice is supplied.

Dr. Humfeld also suggests that this technique might be employed for the culturing of other kinds of higher fungi, useful in the production of commercial solvents, antibiotics and other substances.

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ANTHROPOLOGY

African Man-Like Ape May Have Been Ape-Like Man

➤ THE man-like ape of South Africa, Plesianthropus, may have been an ape-like man instead. Such is the indication of some recent research into his brain size made by his discoverer, Dr. Robert Broom of the Transvaal Museum, along with Dr. J. T. Robinson.

Restorations of the brains to fit the cavities of the several skulls that have thus far been discovered give volumes ranging from as low as 400 cubic centimeters in females to as high as 700, or possibly even 750, in the largest male skull.

Modern gorillas, which are much larger animals than was Plesianthropus, have 500-cubic-centimeter brains, while the cranial content of a modern man's skull is 1500 cubic centimeters or more.

Writes Dr. Broom, in a letter to the editor of *Nature* (March 20): "We know that Plesianthropus had a pelvis that was essentially human, and we can be sure that it walked on its hind feet and used its hands for the manipulation of tools and weapons. If some of the males had brains of perhaps 750 cubic centimeters, we can say with confidence that, if Plesianthropus was not quite human, it was nearly human."

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ENGINEERING

Diesel Research Equipment From Germany to Serve Us

➤ COMPLETE equipment of a former German diesel engine research laboratory, one of the world's largest and best at the beginning of the war, will soon be in use at the Oklahoma Agricultural and Mechanical College, Stillwater, Okla.

This equipment, valued at over \$1,000,000, will be used in the newly established Oklahoma Institute of Technology, formerly the division of engineering of the institution. This state college will have over \$100,000 annually to conduct diesel research and instruction, and this equipment will make it the second largest diesel research center in the United States.

The equipment is a gift from the federal government to the college. It was formerly in the Klockner-Humboldt-Deutz Diesel Engine Research Laboratory at Oberursel, Germany. The Supreme Headquarters Allied Expeditionary Forces sent it to the United States to prevent it falling into the hands of any unfriendly nation and as a means of advancing diesel research in this country.

The complete laboratory consists of three units: an engine testing laboratory for engines of from one to eight cylinders, a materials testing unit, and a fuel injection laboratory.

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INVENTION

Arc Process Cuts Holes in Wire-Drawing Diamond Dies

➤ TINY diamonds have minute holes bored through them more rapidly and cleanly by a newly patented arc process for making dies used in the drawing of super-fine wires. Hitherto the drilling has been accomplished by mechanical means alone, using fine steel needles, with diamond dust as the abrasive. In the new method, this kind of drilling is still used, but in addition a current is fed through the needle, with the diamond embedded in its metal dop to complete the circuit. The minute resulting arc greatly speeds the several steps of the drilling.

Rights in U. S. patent 2,438,941, issued on this invention, are assigned royalty-free to the government by the five-man team of inventors: C. G. Peters, F. K. Harris, W. B. Emerson, I. L. Cooter and K. F. Nefflen.

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PUBLIC HEALTH

Flyless Age Now in Sight

Many towns have waged successful campaigns against these enemies of man and animal with combined weapons of DDT and modern sanitation.

By GERTRUDE ELMSLIE ARUNDEL

➤ BEELZEBUB, prince of devils, was originally god of flies. His name, incised in cuneiform script on ancient clay tablets, is *Baal-Z'bub*, which englishes as "lord of buzzing things." His reign has endured through centuries of filth-engendered pestilence, yet his kingdom is not an everlasting kingdom. Within the past three years, city after city in our land has risen in revolt against him; his subjects have been massacred by millions. We are within sight of a flyless age.

Here are the stories of some of man's successful uprisings against the tyranny of the flies:

In the university town of Moscow, Idaho, there's no market for fly swatters any more. Last year many residents left their windows unscreened all summer long; restaurants did away with flytraps and sticky flypaper and propped open their screen doors. Indeed, flies were so scarce that for two weeks in September entomologists at the University of Idaho were unable to trap a single fly for their research experiments.

Flies Can Be Abolished

From every town where people have rolled up their sleeves and sprayed alleys, stockyards, dwellings, farm buildings with DDT, comes the same good news: the fly, enemy of comfort and carrier of disease to man and beast, can be abolished.

On Mackinac Island, Michigan's famous summer resort, where automobiles are banned and horses are the chief means of transportation, flies were always a serious health menace. Each season hotels had to set out flytraps by the hundreds. Surrey drivers had their spray guns handy at all times, and new coachmen were warned not to take their teams into parts of the island where swarms of flies had maddened more than one horse into bolting. Then the State Health Department decided to take action. A fire-truck pump, rigged with tanks of DDT, sprayed hotels, restaurants, streets and every building in the business district. Such notorious fly hangouts as horse barns, manure piles and the public dump got extra doses.

The DDT wiped out flies so completely that coachmen stowed away their horse nets, and hotels burned their flytraps in a glorious good-riddance celebration on the Fourth of July.

For two years now the Health Department of Muscogee County, Georgia (which includes the city of Columbus), has been battling flies as part of an intensive clean-up campaign. Nearly 23,000 buildings—dairies, food establishments, business houses and private homes—have been blanketed with DDT. Muscogee citizens proudly announce a 90% reduction in the county's fly population—at a cost of 30 cents per inhabitant. And Columbus doctors report a sharp decline in cases of diarrhea and dysentery among children.

Breeding Places Cleaned Up

Evansville, Indiana, also slaughtered flies by the million last summer. When the breeding places had been cleaned up and DDT spread in strategic spots, a flytrap was baited and set outside the door of the college cafeteria. In two days the trap yielded one lonely fly. "Ordinarily," points out Dr. E. A. King, Evansville's Health Officer, "that trap would have been buzzing with hundreds of flies after only a few hours." Tests made at city dumps and other popular fly gathering places showed similar results. "I do not hesitate to estimate that 999 out of every 1000 flies in Evansville were killed in the campaign," says Dr. King. "And there's no way of telling how many million were pre-destroyed through the sudden demise of their ancestors."

Things like that are happening in progressive communities all over the country. Whole states, notably Idaho and Iowa, are putting DDT to work against this age-old pest—and getting phenomenal results.

Iowa is launching its third annual "No Flies in Iowa" campaign. Last summer, encouraged by the almost total elimination of flies in towns where fly control was tested in 1946, more than 400 communities armed themselves with DDT, and 83% of the state's farmers did their part by flyproofing their cattle or dairy barns. Twenty-seven demonstration

centers were set up to train local committees in fly-killing techniques. Residents were bombarded with pamphlets telling them how and when to use DDT, and emphasizing that they should clean up round the house so as to give the poison spray its maximum effectiveness. "Using DDT without proper sanitation is like boxing with one hand behind your back," says Dr. Harold Gunderson, Iowa State Extension entomologist. Dr. Gunderson swears that in the Iowa towns which cooperated, stores and restaurants were completely free from flies throughout the summer, and homeowners reported that they never took the swatter off the hook. In Mason City, the caretaker of the municipal dump, for the first time in his career, was able to eat lunch out of doors without being pestered by flies. "The amazing thing about this program," says M. W. Lackore of the Ames, Iowa, Chamber of Commerce, "is that it really works."

Not only does it work, but it is amazingly cheap. Mason City, with a population of 60,000, enjoyed a fly-free summer for about \$2500, raised by local citizens. Solicitors said that it was the easiest money they had ever tried to raise.

To city dwellers flies are a menace and a nuisance. But to farmers, their extermination means more beef, more milk, cleaner, healthier animals. Hornflies, those tiny insects which you can see by the thousands sucking the blood from the back of a cow, have been eating up the American farmer's profits at the rate of millions of dollars every year. When hornflies are bad, which is for 14 weeks in most parts of the country, beef cattle will not put on weight and dairy cows will not give their full quota of milk.

Cattle Sprayed with DDT

Spectacular results—checked by state agricultural experts—have been obtained by spraying cattle with DDT. Dairymen report increases in milk production up to 25%; treated herds gained 32% more weight than unprotected herds; cattle growers in Kansas got 50 pounds of extra beef per animal for every five cents' worth of DDT. Three applications of DDT during the summer will protect cattle for the season. Stockmen say: "DDT is so effective that cows don't need tails any more. Might as well use them for oxtail soup."

Last year more than half the cattle in Kansas and South Dakota and nearly



SPREADER OF FILTH AND PESTILENCE—Perched on the edge of a saucer, the fly carries filth to food, and is believed to spread such diseases as tuberculosis, cholera, dysentery, infantile diarrhea and typhoid, among others.

all the cattle in Oklahoma were sprayed with DDT—because it pays!

Dr. Ellsworth Fisher, University of Wisconsin entomologist who directed last year's dairy fly control operations, gives the 1000-odd "custom sprayers" in his state credit for making the program a success. Many of these operators are ex-GIs, others are experienced exterminators who have added DDT to a long list of insect-killing weapons.

Business of Killing Insects

In Princeton, Illinois, two former Air Force pilots, Robert Kirkpatrick and Donald Rickard, have built up a profitable business killing insects by land and by air. With a Navy-surplus plane they shower corn with DDT for protection against the corn borer; with a jeep and power sprayer they douse cattle and farm buildings with DDT for fly control. They charge \$40 for a season's spraying of animals and buildings on an average farm—one visit in June, another in August. "Many farmers were skeptical at first," Kirkpatrick says, "but took the gamble. Now they're enthusiastic. One day we sprayed a farm and its herd of 32 cows. The next day milk production went up ten gallons, and stayed up." Last year Kirkpatrick and Rickard had

about 90 customers for fly control, all of whom signed up for service again this spring. One of their biggest jobs was the spraying of the county fair grounds and its buildings, which they did so effectively that even the picnic area, strewn with sandwich crusts and watermelon rinds, was free from flies.

Three years ago George Hockenyos, custom sprayer of Springfield, Illinois, added fly control to the many services of his Sentinel Pest Control Company. Hockenyos sprays homes three times a year, charging about \$10 for each treatment. Last summer he sprayed the 25 buildings of a state institution. One time around took him four days, but when he got through there were "99.44% fewer flies." Hockenyos is confident that some day flies will be a rare sight round all homes and barnyards. An old timer in pest control, he advises newcomers to work for a while with an experienced outfit before going out on their own. It isn't just a matter of killing flies, he points out. "You have to kill them in the right places. In a restaurant, for example, DDT should not be used near open food. Flies would walk through the poison, then die in the food. After a few dead flies in the soup," he says, "the restaurant has lost its business—and you've lost yours."

Caution Against DDT Poisoning

While harmless to people and to most animals in the weak dilutions prepared for these campaigns, DDT should be used with caution, for it is after all a poison. Promiscuous treatment of crops and fields may result in the poisoning of birds and honey bees, and upsets in the balance of nature. When spraying is done on the farm, drinking bowls and feed troughs should be covered, and DDT in oil solution should never be used on cattle, for it will penetrate the skin. And cats should never be sprayed with it, because of their cleanly habit of licking themselves.

Ever since flies were sent to plague the Pharaohs, we've been shooing, swatting and swearing at them. And they've been hopping around from filth to food, carrying some 20 diseases—including tuberculosis, cholera, dysentery, infantile diarrhea and typhoid. It takes years to gather final evidence, but present indications are that the incidence of many of these diseases will drop along with the fly population. Yet now there seems no doubt that with the combined weapons of DDT and modern sanitation we can make the fly a rare museum specimen.

There's no reason why your com-

munity cannot be made flyproof this summer. If you live on a farm, write to your county agent or to your agricultural experiment station for advice and further details. If you are a town or city dweller, get your local newspaper or service clubs to start a campaign, or call up your health commissioner and keep buzzing until he does something.

Science Service took a prominent part in the anti-fly campaign of 1947, through a series of illustrated articles written by Dr. Frank Thone, and is preparing to participate similarly in the 1948 drive. The foregoing article was prepared for the Science News Letter in cooperation with The Reader's Digest; it will appear in the June issue of that magazine.

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MEDICINE

New Chemical Improves Blood Test for Syphilis

► BLOOD tests for syphilis are becoming more reliable, thanks to a new testing chemical discovered by Dr. Mary C. Pangborn of the New York State Department of Health. Details of the chemical and its use were reported by Dr. Pangborn at the venereal disease symposium held in Washington under the auspices of the National Institute of Health.

When a blood test for syphilis is done on a patient with malaria or a vaccinated person, the report often is positive even when the person does not have syphilis. Such tests are called "false positives." They have long been a source of worry to doctors and patients.

Many of these false positive tests will be eliminated when the new testing chemical is used, it appears from results with it so far.

The chemical is named cardiolipin. It is a phosphorus containing fatty substance obtained from beef heart. For

SCIENCE SINCE 1500

By H. T. PLEDGE

"THE author is to be congratulated for a very thorough coverage of the field. At intervals the author adds chapters which set the stage for the period about to be covered, and in so doing, he indicates the trend of thinking and customs and how they might influence science . . . this book has a definite place in the literature of science."—*Chemical and Engineering News*

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Do You Know?

Livestock often refuse to eat the feed that rats have contaminated.

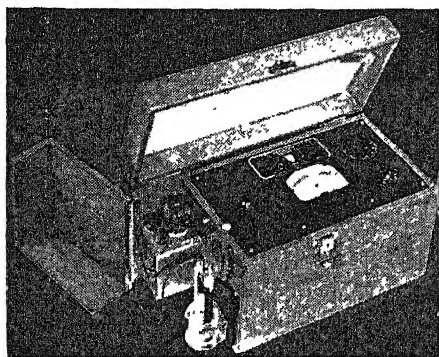
A modern *boiler* used in a power plant may contain as much as 85 miles of tubes.

From a ton of Douglas fir chips between 50 and 60 gallons of *alcohol* can be obtained by a fermentation process.

The *sting* of a honeybee generally hurts even the experienced beekeeper, but immunity from after-effects due to the poison can be gradually acquired.

Rare chemical elements, long thought to be useless, are now finding important applications; *uranium*, of atomic energy fame, was used until recently principally in coloring glassware.

The Galapagos islands, on the equator 500 miles west of South America, have never had any land connection with other lands; their 89 species and subspecies of *bird life* must have arrived as chance wanderers.



pH INDICATOR FOR "EVERYBODY"

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many years extracts from beef heart have been used in blood tests for syphilis, but since these were crude extracts it was almost impossible to get two of them exactly alike. Consequently it was difficult to standardize the test material so that the test would be the same when performed in different laboratories.

BIOCHEMISTRY

Chemical Link to Vitamin

► DISCOVERY and synthesis of a new chemical compound which forms a third link in the chain leading to production in the body of the pellagra-preventing vitamin is announced by Drs. H. K. Mitchell and Joseph Nyc of the California Institute of Technology at Pasadena.

The chemical, known as 3-H for short, can also be obtained from love-in-the-mist, though it is unlikely you will be chewing the seeds of this plant, known botanically as *Nigella*, to get your daily ration of the vitamin.

The vitamin is niacin, or nicotinic acid, known for years as both cure and preventive of pellagra. More recently it was discovered that a quite different chemical, tryptophane, could be substituted for nicotinic acid in the diet of rats without any damage. They grew just as well on one as the other.

Tryptophane is an amino acid, one of the building-blocks of protein. Rats can get along without nicotinic acid if they are given tryptophane because, it is believed, they convert the tryptophane into nicotinic acid in their bodies. Proof for this conversion, however, has not yet been obtained.

Dr. Mitchell and associates, working with the red bread mold known scientifically as *Neurospora*, uncovered two steps in the chemical conversion chain. Tryptophane breaks down into a second stage to become a compound known as kynurenin. This is a result of a rearrangement of the atomic pattern of tryptophane.

In a third stage in the conversion, just discovered, a side chain of atoms is discarded. This results in the new compound, 3-H, known chemically as 3-hydroxyanthranilic acid.

Feeding certain strains of the red bread mold, *Neurospora*, any of the three isolated chemical compounds causes an increase in their production of nicotinic acid. Tests are now being made with rats and preliminary work has shown that feeding these animals any of the

Efforts to purify the beef heart extracts led to discovery of the new compound, cardiolipin.

Besides its advantages of specificity and ease of standardization, the new chemical has the further advantage of being adaptable to different test procedures.

Science News Letter, April 17, 1948

three compounds results in their excreting more nicotinic acid.

Whether it will work in man remains to be seen but Dr. Mitchell points out that surprising number of chemical mechanisms are common to both large and small organisms.

Science News Letter, April 17, 1948

Science Service Radio

► LISTEN in to a discussion on uranium, source of atomic energy, on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p.m. EST Saturday, April 24. Dr. Robert A. Millikan, head of the California Institute of Technology, as the guest of Mr. Watson Davis, director of Science Service, will discuss the shortage of uranium. Dr. Harlow Shapley, director of Harvard College Observatory, will give a brief report on the ideas and accomplishments of Science Service.

Science News Letter, April 17, 1948

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CHEMISTRY

Protein Protects Metals

Chromated milk-protein films are used to coat such metals as zinc, iron, brass and aluminum to protect them from corrosion damage.

➤ A MIXTURE of casein from milk and a chromate is found to be an inexpensive, valuable protection for such metals as zinc, iron, brass and aluminum from damage in mildly corrosive atmospheres, the National Bureau of Standards reveals.

The process is simple. The metal to be coated is first dipped in a solution of casein, or of albumin or gelatin, allowed to dry, and then immersed in an acidified chromate solution. This contains weak chromic acid or a dichromate of zinc, iron or nickel. The protein coating becomes impregnated with the chromate, which both hardens it and delays corrosion.

During the war ordinary carbon steel became widely used as a substitute for scarce copper, brass, aluminum and stainless steel. While the steel was generally protected with zinc coatings, the tendency of the zinc to form objectionable corrosion products brought about a wide use of chromate films on the zinc. These films were found useful, but it was thought that an enhanced corrosion resistance would be obtained

by applying a larger quantity of chromate to the metal. The proteins were found to be a good medium for increasing the amount of chromate on the metal surface since they are basic and readily absorb or combine with chromic acid.

The development at the Bureau of Standards was carried out by staff members Abner Brenner, Grace Riddell and Robert Seegmiller. The chromated protein films are yellow and transparent. They do not crack or separate when the metal is bent. They are not injured by heating to approximately 300 degrees Fahrenheit, while most chromate films produced chemically on zinc lose much of their protective value at about the boiling point of water.

The protective value of these chromate-protein films is much superior to that of corrosion-inhibited oils and waxes, the Bureau states. They are almost insoluble in water, and are so hard that they can not be scratched with the finger nail. They can be quickly removed from metal parts by an alkaline solution such as 5% sodium hydroxide.

Science News Letter, April 17, 1948

GEOLOGY

No Antarctic Uranium

➤ ANTARCTICA is not likely to be the scene of a "uranium rush" or any other kind of international scramble for mineral wealth, at least in the immediate future. Comdr. Gerald L. Ketchum,

leader of the Navy's two-ship 1947-48 Antarctic expedition which has just returned after five months "down under," stated that "no minerals of any commercial value" had been found at any point

on the coast. And the expedition worked its way along the shores of the world's southernmost continent through more than half its perimeter.

More than two tons of mineral specimens were brought back by Dr. Earl T. Apfel of Syracuse University, geologist of the expedition, but they are "just rocks." They do have considerable scientific interest, for by analyzing them Dr. Apfel hopes to get some idea of the geologic age of the continent. In one area there were quantities of garnets, left by the disintegration of granitic rock; but these again are without commercial value.

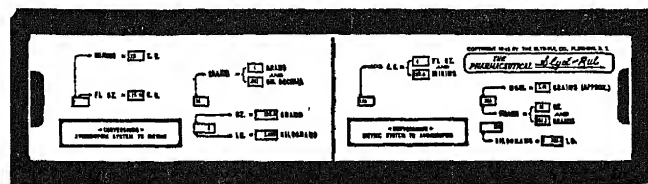
Disillusioning also was a visit to the Bunker Oasis, the ice-free area of land and lakes spotted from the air by a preceding expedition. It proved to be ice-free merely because the lie of the land caused the glaciers to part instead of flowing over it. The lakes, which were unfrozen when observed before, were frozen this time, and they were all salty, at that. No sign of life was found in the place, save one dead seal.

The expedition accomplished its primary mission, which was to make exact geodetic locations of certain landmarks, with which the air photographs taken on the preceding Navy expedition can be "tied in," thereby making more accurate charts possible. Comdr. Ketchum praised the performance of his two ships, the new ice-breakers *Burton Island* and *Edisto*. He also said that the expedition's helicopters performed well, within their limited range.

Weather was "nice," he added. Average temperatures were a little below freezing, and the lowest reading recorded was four degrees above zero Fahrenheit.

Science News Letter, April 17, 1948

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East Meets West

➤ **EASTERERS**, spending their first spring season in southern California, Arizona or New Mexico, are very apt to exclaim over finding violets and buttercups, anemones and shooting-stars

among the chaparral. Even some of the other flowers which they don't recognize so easily, like some of the western pentstemons and mimuli, have the same delicacy of texture to their leaves, the same dainty tints to their flowers, that mark the spring offerings of the humid woods of the East and somehow seem out of place in the harshness of the Western brushlands.

The secret is that for a few weeks in spring the desert is not quite a desert, and the humid woods are not as humid as they seem: East and West have met each other halfway. What little rain the desert gets is most likely to fall in late winter and early spring, and the seeds and bulbs and rootstocks of the desert's spring flowers take quick advantage of this moisture and expand their leaves and open their flowers in the mild warmth of the April sun.

At the same time, the Eastern woodlands are being swept by spring winds and are getting nearly the full benefit of the warm sunshine, with as yet very little development of the leafy canopy that will later block off a large part of the light and slow the winds to

weak breezes. This means that evaporation rates are much higher in April than they will be from mid-May onwards: for a little while, the woodlands approach the condition of the chaparral as the chaparral approaches the condition of the woodlands.

Somewhat similar, though with a difference, is the later coming of spring to the higher altitudes, where the last of the snows do not thaw away until June or (at the greater elevations) even early July. Here the same delicate spring flowers appear, to strangers' eyes seeming incongruous as they crowd amid the rocks or carpet a meadow on the bank of a glacier-fed stream.

Blossom-time is short on the mountainsides, so you are apt to find a grand jumble of spring, summer and autumn flowers, all hurrying through their cycle of bloom and seed production, as if they knew they have a frozen deadline to beat. There will be harebell and phlox for the spring, Indian paintbrush and evening primrose for the summer, and fringed gentian and wild aster for the autumn, all going at once.

Science News Letter, April 17, 1948

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MEDICINE

Ulcer Patients Need Rest

➤ **COMPLETE** physical rest for patients with stomach ulcers gets strong support from research by Dr. C. W. Lillehei, National Cancer Trainee, and Dr. O. H. Wangenstein, professor of surgery, at the University of Minnesota Medical School at Minneapolis.

Moderately severe physical activity from fairly strenuous exercise, they find, helps bring on a certain type of ulcers in dogs. The ulcers are the kind that come following injections of histamine, a body chemical which stimulates stomach activity and dilates small blood vessels.

Histamine provoked ulcers about three times as often in dogs tired by strenuous muscular activity as in dogs that were not doing tiring exercise, the scientists report to the *Society for Experimental Biology and Medicine* (Jan.).

Strangely, however, muscular fatigue decreased the output of hydrochloric acid in the dogs' stomachs. By decreasing the acid output, it might seem that muscular fatigue would decrease instead of increase ulcer formation. The apparent paradox, the scientists explain, suggests that muscular fatigue affects the stomach lining itself and makes it more vulnerable to the action of the acid-pepsin mixture in the stomach juices.

Strenuous muscular exercise probably affects the stomach lining by changing its blood circulation. The exercise would cause blood to be diverted from the stomach lining to the leg muscles.

Constricting the blood vessels, so that less blood gets to the stomach lining, aids and abets ulcer formation, the scientists found in another experiment. The blood vessel constriction in this case was brought about by injections of adrenalin. This fits in with the muscular fatigue findings because muscular fatigue is known to cause liberation of adrenalin in the body.

Science News Letter, April 17, 1948



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BIOLOGY AND HUMAN AFFAIRS—John W. Ritchie—*World Book*, new ed., 818 p., illus., \$3.40. A very attractive high school text.

COLLEGE PHYSICS—E. F. Burton, H. Grayson-Smith and F. M. Quinlan—*Pitman*, 724 p., illus., \$4.50. A text intended for those who are not going to specialize in any of the sciences.

INTERNATIONAL MIGRATION AND ONE WORLD—*National Committee on Immigration Policy*, 107 p., illus., 25 cents. Background material for the understanding of this important problem. It contains a chapter on "The Displaced Persons—An Immediate Problem in International Migration."

PERSONNEL AND TRAINING PROBLEMS CREATED BY THE RECENT GROWTH OF APPLIED STATISTICS IN THE UNITED STATES—Committee on Applied Mathematical Statistics — *National Research Council*, 17 p., paper, 25 cents

PINTO'S JOURNEY—Wilfrid S. Bronson—*Julian Messner*, 57 p., illus., \$2.50. An adventure tale which introduces children, and the adults reading over their shoulders, to life and nature in an Indian village. The beautiful drawings are by the author.

PROCEEDINGS OF A SYMPOSIUM ON LARGE-SCALE DIGITAL CALCULATING MACHINERY—Navy Department Bureau of Ordnance and Harvard University—*Harvard University Press*, 302 p., illus., \$10.00. The authoritative opinions of mathematicians, physicists, and engineers interested especially in this field.

SCIENCE AND TECHNOLOGY IN CHINA, Vol. 1, No. 1, S. C. Woo, Ed.—*Natural Science Society of China*, 16 p., illus., paper, bimonthly, single copies 40 cents, year \$2.00. U. S. subscribers should write to Mr. S. H. Doo, 7137 Pennsylvania Ave., Pittsburgh 8, Pa. A new science journal published in English at National Central University, Nanking. It is, in spirit, a continuation of a journal published in cooperation with the British Council in China.

SCIENCE AND YOU—George W. Fowler, Morton C. Collister and Ernest L. Thurston—Iroquis, 378 p., illus., \$2.12. A text for the seventh year.

SEA ISLANDS OF GEORGIA: Their Geologic History—Count D. Gibson—*University of Georgia Press*, 73 p., illus., \$2.00. The answers to the questions of visitors concerning these interesting islands born from a single large island and the result of glacial action and erosion.

SYNTHETIC PETROLEUM FROM THE SYNTHINE PROCESS—B. H. Weil and J. C. Lane—*Chemical Pub. Co.*, 303 p., illus., \$6.75. The chemistry of the Fischer-Tropsch process for making gasoline from a variety of raw materials including natural gas and coal.

THE YEARBOOK OF PSYCHOANALYSIS, Vol. 3, 1947—Sandor Lorand, Ed.—*International Universities Press*, 309 p., \$7.50. A group of papers of interest especially to psychologists and physicians.

Science News Letter, April 17, 1948

foot and mouth disease would be the prospect of getting leading scientists to come to the laboratory near New York City. Getting scientists for the project is a major problem, Dr. Simms emphasizes.

New York congressmen, however, say that if the laboratory isn't good enough for the mainland, it isn't good enough for Long Island.

Texas representatives supported the measure against the disease, now some 300 miles from the Rio Grande, but they added resolutions from groups of cattlemen urging that the laboratory not be located in the Lone Star state.

Members of the House are generally agreed on the importance of setting up the new laboratory, but no one, it appears, wants it in his district.

Science News Letter, April 17, 1948

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VETERINARY MEDICINE

Foot-Mouth Lab Shunned

➤ A SHINY new \$25,000,000 to \$28,000,000 laboratory being planned to spearhead a long-range attack on foot and mouth disease is already one of the nation's least popular scientific institutions.

Department of Agriculture officials want to build the new research center at Camp Hero, Montauk, Long Island. Long Islanders, it seems, do not want it.

Location of the laboratory has come under fire on the floor of the House of Representatives. A bill introduced by Rep. George W. Gillie, R. Ind., a doctor of veterinary medicine, calls for construction of the foot and mouth study center off the mainland of the U. S. Islands separated from the mainland by waters suitable for deep-water navigation were permissible.

This would have permitted use of the Long Island site, termed "our first

choice" by Dr. B. T. Simms, chief of the Department of Agriculture's Bureau of Animal Industry.

But Rep. W. Kingsland Macy, R., N. Y., in whose district the laboratory would be established, protested. He introduced an amendment which was passed to prevent construction of the center on a site connected to the mainland by a bridge or tunnel.

Dr. Simms declares that the laboratory would not be dangerous. Infected cattle would be kept in buildings where even the outgoing air would be sterilized. Wastes would be piped out to sea. There would be no noises or odors to disturb neighbors to the mile-square laboratory area.

The buildings would even "be pleasing to the eye," the Department of Agriculture spokesman has promised.

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New Machines and Gadgets

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✿ **WINDOW WASHER**, and automobile cleaner, is a long, light aluminum tube attachable to an ordinary garden hose and a variety of brushes to attach to the other end. Water and brush combine to do the cleaning in this improved type of extension cleaner, and the user gets no wetting.

Science News Letter, April 17, 1948

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✿ **VERY HIGH FREQUENCY (VHF)** output, a type of radio wave coming widely into use in static-free radio, facsimile and television, is accurately measured by a VHF milli-wattmeter which operates on the ordinary house electrical current. One method of measurement with it uses a thermistor bridge arrangement; another a PM filament brilliance comparison.

Science News Letter, April 17, 1948

✿ **GAS TEMPERATURE INDICATOR**, for use with gas turbines, ramjets and rockets, measures temperatures to 5,000 degrees Fahrenheit. It has a probe to insert into the gas stream and a gas thermometer which utilizes the density of the gas being measured as a direct indication of temperature.

Science News Letter, April 17, 1948

✿ **THREE-PIECE MATTRESS**, held together with zippers, is easily separated



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Science News Letter, April 17, 1948

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Science News Letter, April 17, 1948

✿ **SHAVING STAND** for the bathroom consists of an upright on a base with a crossarm at the top, one end of

which is shaped to hold a shaving brush, suspended by the handle, and the other to hold a safety razor. The base has a slot for used razor blades and a removable bottom for easy emptying.

Science News Letter, April 17, 1948

✿ **DETECTOR** for the invisible ultraviolet rays from a germicidal lamp is a tiny tube which may be held in the radiation where it glows from the ultraviolet. The glass in the tube passes the short-wave radiation, and a phosphor coating inside turns it into a visible green light.

Science News Letter, April 17, 1948

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Question Box

ANTHROPOLOGY

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BIOCHEMISTRY

What are the chemical steps in photosynthesis? p. 243.

CHEMISTRY

How does protein protect metals from corrosion? p. 253.

Photographs: Cover, Harvard University; p. 243, U. S. Air Force; p. 245, Textile Research Journal; p. 247, U. S. Fisheries Laboratory; p. 251, Bureau of Entomology and Plant Quarantine, U. S. Dept. of Agric.

GENERAL SCIENCE

What plans are being made for the development of the Middle South? p. 246.

MEDICINE

How do fat-rich meals lead to hardening of the arteries? p. 247.

Why should nose remedies be tested on animals first? p. 245.

PUBLIC HEALTH

What accomplishments are expected through WHO? p. 244.

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SCIENCE NEWS LETTER



Vol. 53, No. 17

THE WEEKLY SUMMARY OF CURRENT SCIENCE • APRIL 24, 1948



Misty Mountain Rats

See Page 265

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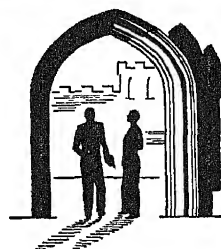


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PHYSICS

Early Stages of Universe

Creation of chemical elements took only one hour, new theory indicates, because as the material expanded the opportunity for particles to collide decreased.

➤ AT almost the beginning of things, the universe and all creation was a highly compressed neutron gas.

That is science's latest view of the primordial matter, just about two billion years ago when the universe started expanding.

At the very beginning of everything, the universe had infinite density concentrated in a single zero point. Then just 300 seconds—five minutes—after the start of everything, there was a rapid expansion and cooling of the primordial matter.

The neutrons—those are the particles that trigger the atomic bomb—started decaying into protons and electrons and building up the heavier chemical elements. This went on for just about one hour. Lo, the stuff of the universe was almost completed.

This picture of the early stages of the whole universe has been worked out by a young physicist, R. A. Alpher, on the staff of the Applied Physics Laboratory of the Johns Hopkins University, located at Silver Spring, Md., near Washington. His research on "The Origin of the Chemical Elements," as it is titled in the *Physical Review* (April 1), was done for his Ph.D. thesis at George Washington University. Two distinguished physicists, Dr. G. Gamow of George Washington and Dr. H. Bethe of Cornell, are his collaborators.

This act of the creation of the chemical elements took the surprisingly short time of an hour. (The Bible story said something about six days for the act of creation.) The reason for this hour's time is that as the material expanded the opportunity for collisions among the particles decreased. The building blocks of the elements got out of touch with each other.

This is just what happened as visualized by Mr. Alpher:

The early stage of matter was an overheated neutral nuclear fluid. It had a density about that of iron, eight grams per cubic centimeter or about 500 pounds per cubic foot. When the universe began expanding, the gas pressure fell. Protons (hearts of hydrogen atoms) and electrons (particles of electricity) were

formed. First hearts of heavy hydrogen (deuterium) atoms were formed. Then by subsequent captures of neutrons by the newly formed protons heavier and

MEDICINE

New Vitamin from Liver

A single shot of B₁₂, chemical extracted from liver, promptly started formation of new red blood cells in patients with pernicious anemia.

➤ A FEW small, red, needle-shaped crystals injected by hypodermic needle once in a while instead of half a pound of liver to be eaten every day or liver extract injections every week for life—that is the pleasing new prospect for pernicious anemia patients.

It results from the discovery of a new vitamin, which has been named B₁₂. The red vitamin crystals seem to be the chemical in liver which does the job of checking or controlling pernicious anemia, much as insulin controls diabetes.

The new vitamin was isolated from liver by Edward L. Rickes, Dr. Norman G. Brink, Frank R. Koniuszy, and Drs. Thomas R. Wood and Karl Folkers of Merck and Co. research laboratories at Rahway, N. J. The scientific world which for months had been agog over rumors about the new vitamin, read about it in the journal, *Science* (April 16).

Three patients have been given the new vitamin under the direction of Dr. Randolph West of Columbia University's College of Physicians and Surgeons. A single shot of a very tiny amount of the vitamin promptly started formation of new red blood cells and brought about an increase in number of red blood cells and hemoglobin.

It is still too early to say whether the blood will return to normal without further doses of the vitamin, Dr. West cautions. But it may be possible by giving a sufficiently large dose to produce a prolonged period of freedom from symptoms. This would free the patient from the annoyance and expense of the more frequent injections now required.

heavier hearts of atoms were built up. Most of this happened in about the first hour. The present spread of various kinds of chemical elements was attained somewhat later by the atoms formed adjusting their electric charges by giving off electrons.

That is the latest story of creation as worked out by the latest theories of physics and it began to happen just about two billion years ago, minus those 300 seconds needed to get the process started.

Science News Letter, April 24, 1948

The vitamin is so powerful that the single dose which brought improvement in anemia patients weighs only about as much as one two-hundredth of an inch of a human hair.

Patients will not be able to get the new vitamin for some time. There is so little of it that it cannot even be supplied to research workers in other institutions for study. It took tons of liver to get two or three milligrams of the vitamin, and



NEW DIRECTOR—Dr. John R. Heller of Bethesda, Md., recently appointed Director of the National Cancer Institute of the Public Health Service, is expected to assume his new duties on May 15. He will replace Dr. Leonard A. Scheele.

1,000 milligrams are the equivalent, approximately, of only one-thirtieth of an ounce.

Important to discovery of the new vitamin was the finding of a suitable kind of guinea pig for testing the compounds the chemists were extracting in the search for the vitamin. Testing these substances on patients was not practical

because not enough untreated pernicious anemia patients could be found. The guinea pig used is not a pig at all, but a microorganism called *Lactobacillus lactis* Dorner. Its suitability for the vitamin testing was discovered through studies by Dr. Mary S. Shorb of the University of Maryland.

Science News Letter, April 24, 1948

PSYCHOLOGY

Neurotic Is "Under-Done"

View that he suffers from too little conscience and his cure depends on learning better the moral and social codes, comes from Harvard psychologist.

➤ THE neurotic is "an under-done human being." He is "a victim of underlearning, immaturity and ignorance." His cure depends on his learning better the moral and socializing lessons his parents and others in authority tried to teach him when he was a child.

This picture of the neurotic and what to do about him was given by Dr. O. Herbert Mowrer, Harvard psychology professor, at the meeting in New York of the American Orthopsychiatric Association.

In viewing the neurotic as a person whose trouble comes from having too little rather than too much conscience, Dr. Mowrer differs from Freud and many other psychiatrists.

The neurotic, in Dr. Mowrer's opinion, has taken in the rules and principles that are generally known as the dictates of conscience. But he has not accepted them. Just as the child between two and six years is constantly saying "No" to parents and their rules, the grown-up who is neurotic is constantly saying "No" to these same rules which his conscience is dictating. But the opposition and defiance goes on under the surface.

"The internalized criticisms and admonitions of parents and community are now muffled and are no longer heard clearly and explicitly," Dr. Mowrer said. "But they are still capable of breaking through into consciousness as depression, anxiety and inferiority feeling.

"Symptoms are then formed as means of dealing with these distressing affects (feelings that affect the person, not effects), and the afflicted individual is a full-fledged neurotic."

Criminals result, instead of neurotics, when the resistance and opposition to authority, the "No" period of childhood,

is continued with little change into later life. Admitting that this is a greatly oversimplified explanation of criminal psychology, Dr. Mowrer used it to show the criminal personality-type as the extreme in failure of socialization with the neurotic between that and the normal individual.

Dr. Mowrer agrees with Freud on the importance of "transference" in psychiatric treatment. By transference is meant the process in which the patient comes to feel toward the psychiatrist as he did toward his parents when he was a child. By this process the resistance to rules and principles is brought out.

But Dr. Mowrer disagrees with Freud in the next step in treatment. The Freudian idea is to strengthen the neurotic's pleasure drive and relieve him of what Freud considered too strong a conscience.

Dr. Mowrer, holding to the theory that the neurotic has too little conscience, says the psychiatrist should help him acquire more real conscience. Or, in other words, help the patient learn to give up present and instinctual pleasures for the more lasting satisfaction of being a full-fledged member of society.

Besides the learning neurotics need, they must also do some unlearning, Dr. Mowrer pointed out. They must unlearn the ways they so cleverly devised in the past to dodge becoming grown-up, responsible members of society.

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EVOLUTION

Twins and Triplets Seen On "Evolutionary Decline"

➤ YOU are more likely to become the parent of twins than your great-great-grandchildren will be.

Mankind seems to be losing the ability to produce more than one infant at a birth, suggests Prof. A. H. Schultz of the Johns Hopkins Medical School in Baltimore, in the *American Journal of Physical Anthropology* (March).

Previous opinion has tended to be that twinning in the human species is a product of recent evolution, resulting from man's "domestication." But Prof. Schultz's studies, which included not only man but all his subhuman kin among the apes and monkeys, show that the farther down you look on this evolutionary ladder the more often you see twins and triplets. Hence multiple birth appears to be a primitive, not a lately acquired, character in heredity.

Science News Letter, April 24, 1948

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MEDICINE

Longer-Lasting Penicillin

New mold remedy preparation will linger in the body at germ-fighting level for four days after a one-shot dose of penicillin.

➤ A ONE-SHOT dose of penicillin that lingers in the body at an effective germ-fighting level for four days was announced by a five-man research team at the venereal disease symposium held in Washington by the U. S. Public Health Service.

The painful, every three hours day and night injections that patients getting penicillin treatment have had to undergo will be a thing of the past when the new product is on the market, scientists believe.

Named so far only as product F, the new penicillin preparation was invented by Dr. F. H. Buckwalter, director of products development at Bristol Laboratories. Working with him in its development was Dr. H. L. Dickison, director of pharmaceutical research for Bristol. Dr. D. K. Kitchen, medical director of Bristol-Myers Company, reported at the meeting on tests conducted by himself and Drs. Evan Thomas, Richard H. Lyons, M. J. Romansky, and Charles R. Rein at Bellevue Hospital, Syracuse University Hospital and New York Post-Graduate Hospital.

The new, long-lasting penicillin preparation consists of procaine penicillin G in peanut oil with two percent aluminum monostearate in small particle size.

Ever since penicillin was first used to treat patients, scientists have sought a way to keep the precious mold chemical in the body longer. In the early days when the chemical was very scarce, doctors resorted to extracting it from the urine of patients getting the drug, so as to conserve every bit.

Mixing penicillin with peanut oil and beeswax was one of the first methods tried for holding it in the body longer. Combining penicillin with procaine is one of the most recent developments. The monostearate used in the newest penicillin preparation delays the excretion of penicillin. In addition, it is said to be a perfect suspending agent because it produces a thixotropic gel. This means that the material is in a solid jelly form so long as it is standing undisturbed. But when the doctor is ready to inject it, he taps the tube or ampule, and the gel immediately turns into a liquid.

A sister preparation, made of the

same chemicals with penicillin, is already on the market under the name of Flo-cillin. The only difference between this and the new F product is in the size of the penicillin particles in the gel. In Flo-cillin they are large, in line with findings of a year or so ago that large penicillin particles were absorbed more slowly and the effect lasted longer. In the gel preparation, however, the small particles turned out to be even

more effective than the large ones.

While a single shot of product F stays in the blood in germ-fighting amounts for four days (96 hours), the same dose of Flo-cillin lasts only 48 hours while four other penicillin preparations dropped below germ-fighting levels in 24 to 30 hours.

Among patients given the same dose of penicillin in six different preparations, including product F, Flo-cillin stayed at germ-fighting levels for 48 hours in just over half the patients (52.2%). The next best was procaine penicillin G in peanut oil which lasted 48 hours in 40% of the patients. But the new product was at germ-fighting levels after 48 hours in 88.1% of the patients, and after 96 hours in 75%.

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ANTHROPOLOGY

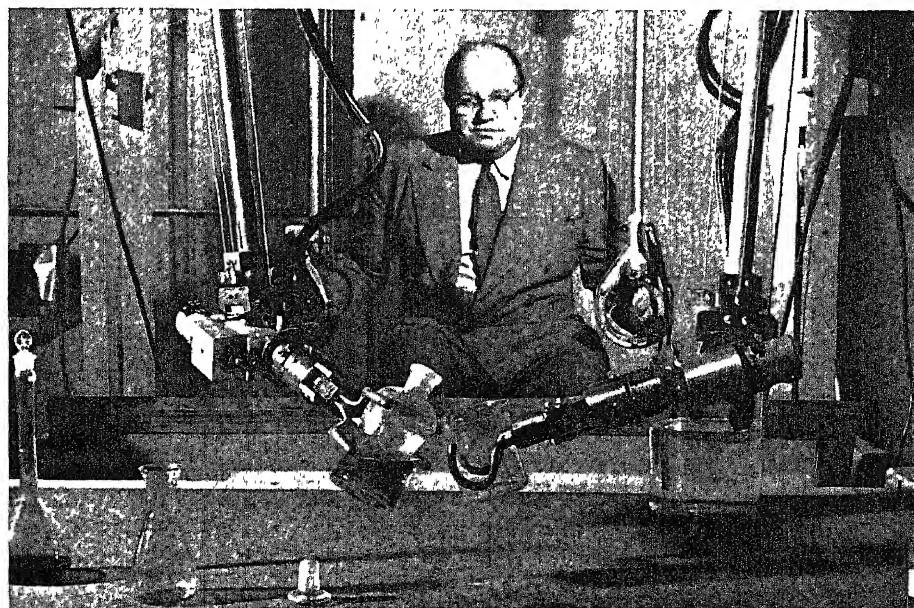
Identifying GIs' Bones

➤ THE sad task of bringing back the remains of Americans who died in service overseas is being helped by physical anthropologists, the scientists whose job is the close study of the human body and the bones that are in it. Men of this discipline have been able to assist in identifying the bodies, or even the bare bones, of fallen soldiers whose "dog-tags" and personal papers had become

lost in the turmoil of modern battle.

At the meeting of the American Association of Physical Anthropologists in Washington, Dr. H. L. Shapiro of the American Museum of Natural History, who was active in setting up the identification service of the Army, told of some of the problems the scientists faced.

In some instances it even went so far as to require the sorting out of non-



REMOTE-CONTROLLED MANIPULATOR—Mechanical "hands," principal part of this device, developed by General Electric scientist John Payne for use in radioactive areas, are able to perform delicate chemical experiments, operate machine tools, and do countless other tasks requiring great dexterity. The "hands" extend over a protective wall into a radioactive area, while the operator remains in an adjacent room.

human bones from among human ones. This occurred when the untrained soldiers who did the actual disinterring of hasty battlefield burials came upon the bones of dead farm animals. To the layman all bones look alike, but an anthropologist knows which are human.

In one case an anthropologist was able to prevent what would have amounted to actual grave-robbery. A number of bodies of American fliers, killed when their planes crashed during a flight over Vienna, were buried in a Viennese cemetery. Their graves were properly marked and recorded, but the digging squad who exhumed their remains proved too zealous, and brought up also the bones of earlier burials at a deeper level. When the anthropologist protested that some of the bones were female, the soldiers did not want to believe him. However, the production of scraps of women's clothing settled the matter.

Sometimes the scientists have been able to show that a lot of mixed bones represent two persons instead of one. Two skulls would indicate that to anyone, but the layman might not notice duplicate left collarbones or two shoulderblades or shinbones that don't match.

Dentists' records, said Dr. Shapiro, are often exceedingly helpful, sometimes leading to a positive identification.

Science News Letter, April 24, 1948

GENERAL SCIENCE

Divorces Declined Faster Than Marriages Last Year

➤ THERE were fewer marriages and fewer divorces last year compared with 1946, with divorces decreasing twice as rapidly as marriages, figures released by the National Office of Vital Statistics of the U. S. Public Health Service revealed.

Marriages dropped off one-eighth, while divorces fell more than one-fourth in 1947 contrasted with 1946. There were nearly 14 marriages per 1,000 population in the United States last year, with a little more than three divorces for each 1,000 persons.

Meanwhile, statisticians of the Metropolitan Life Insurance Company in New York have reported that wartime marriages led to a post-war boom in divorce rates.

More marriages were broken up by divorce in the five years, 1941-46, than ended in divorce in 14 years of married life before the war, it was calculated.

Science News Letter, April 24, 1948

MEDICINE

Cancer Secrets in Color

➤ COLOR photographs built from the absorption of invisible ultraviolet light are the latest hope of cancer fighters that they will have a speedier, surer way of telling the cancer cell's composition in contrast with the healthy cell.

Behind this important technical development, announced at the opening of the new Sloan-Kettering Institute for Cancer Research in New York, is the courage and determination of a Naval officer who kept fighting even when told he would eventually die of a kind of cancer, leukemia.

He is Capt. Robert Conrad, U.S.N., Ret. He was a leader in naval research during the war, and he is now assistant director of planning at Brookhaven National Atomic Laboratory.

When doctors at Memorial Hospital Center, of which Sloan-Kettering is the research branch, told Capt. Conrad he had leukemia, he said:

"I want to do something to help the fight against cancer before I die."

Dr. C. P. Rhoads, director of Memorial and Sloan-Kettering, suggested that Capt. Conrad use his wartime experience with Naval Research and in-

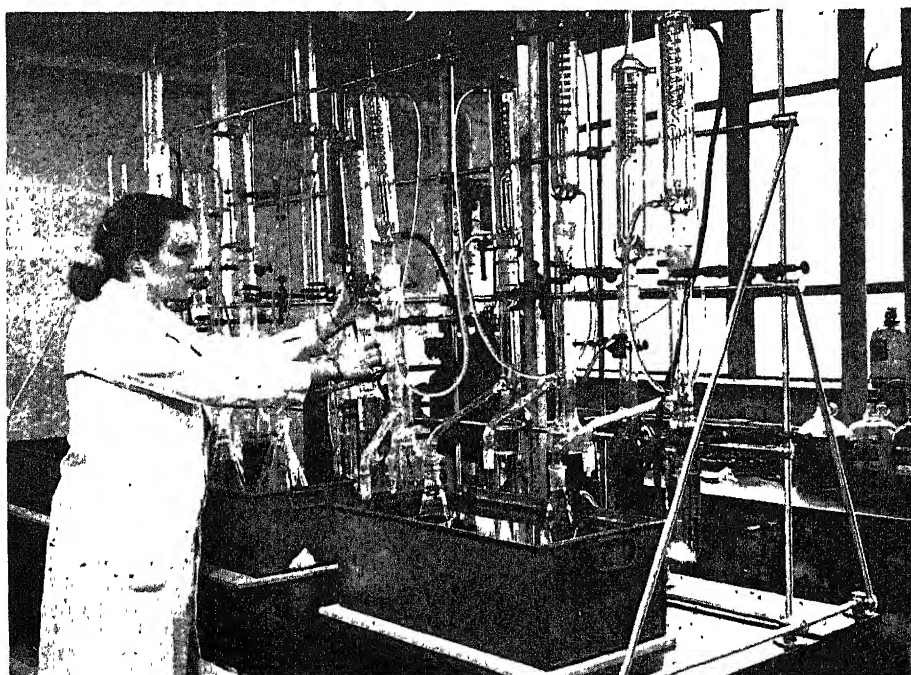
dustrial concerns. So Capt. Conrad went around the country, interesting industrial laboratories in cancer research.

The first concern to start work on the cancer war was the Polaroid Corporation. Under a contract with the Office of Naval Research and with Dr. Edwin H. Land, Polaroid's president, himself guiding the research, this firm has put its new techniques of color photography to work on the cancer problem.

Cancer cells, like all living cells, are transparent and colorless in ordinary light. The same cells, however, have characteristics corresponding to color when illuminated in ultraviolet light. Since ultraviolet light is itself invisible, special methods had to be used to record the ultraviolet color characteristics of living cells. To accomplish this, the color translation principle suggested by the Russian scientist, Brumberg, was followed.

Pictures of living cells were taken in three wave lengths of invisible ultraviolet light where the cells have their color. These were translated photographically into colors visible to the eye.

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EXTRACTION OF HORMONES—One of the processes in the complex study of steroid hormones, part of the cancer-fighting program at Sloan-Kettering Institute, is their continuous extraction from the urine of diseased and normal persons.



MEMORIAL CENTER—Left to right are the Sloan-Kettering Institute and Memorial Hospital, while in the foreground can be seen the Strang Prevention Clinic.

MEDICINE

Plan for Cancer Attack

Opening of Sloan-Kettering Institute for Cancer Research, with its cancer war plan calling for a push on six fronts, may lead to finding cure for disease.

➤ THE world's best chance for finding a cancer cure may come from the recent opening in New York of the Sloan-Kettering Institute for Cancer Research. For this is not just a 14-story pile of bricks and steel and glassware and microscopes. It is a method and an idea and a world-wide cancer war plan. The strategies devised there may bring victories in battles fought by cancer patients and their doctors all over the world.

The idea of fighting cancer according to a plan instead of by haphazard skirmishes on this or that front comes from Dr. C. P. Rhoads, director of the new institute and allied Memorial Hospital.

Many persons, scientists as well as laymen, think it impossible to fight cancer through a plan or program because, as they put it, "cancer is as mysterious as life itself." To this objection Dr. Rhoads says, "That's just nuts." More formally, he points out that cancer, in light of modern knowledge, is "not necessarily less vulnerable or more mys-

terious than many other problems with which science has been confronted and which it has solved in the past."

The Sloan-Kettering Institute cancer war plan calls for a special push on each of six fronts. In each of these special areas, Dr. Rhoads believes, enough has been learned, enough progress has been made, to justify intensive efforts. The six are:

1. Steroid hormones. These include the sex hormones, known to be important in cancer, and certain "mismanufactured" hormones discovered in cancer patients.

2. Biophysics. Searching for better radioactive chemicals to treat cancer and developing equipment for their study and use come under this program.

3. Clinical investigation.

4. Protein chemistry. The proteins in the nucleus of cells are involved in both cancer and normal growth. A push here may show how to control the abnormal growth or perhaps to destroy the

cancer by getting radioactivity right into its nucleus.

5. Experimental chemotherapy, which includes testing every kind of chemical that might be a cancer remedy.

6. Experimental pathology. From this front may come cancer detection tests and methods for inducing cancer tissues to take up much larger amounts of poisons or radioactive chemicals than normal cells do.

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ASTRONOMY

Booby Traps and Inflation Complicate Eclipse Study

➤ WATCHING an eclipse isn't all telescopes and cameras. American astronomers are contending with:

Booby traps and land mines.

Skyrocketing inflation.

Capital city mapped as several hundred feet southeast of its true position.

All seven expeditions of the National Geographic Society for studying the annular solar eclipse on May 8-9 have now reached assigned observation sites. They are in Burma, Siam, China, Japan, Korea and the Aleutians but one group was forced to find new quarters.

The hazard of hidden explosives left behind on the mountainous Kiska volcano, when the Japanese invaders secretly evacuated the island in 1943, made it dangerous for the party to camp as planned on the volcano slopes at the north end of the island. The Kiska site was finally abandoned, the party moving to Adak some 275 miles east of Kiska. This gives the Society two observing teams on Adak, another group having previously been assigned to the island.

The accepted position of Tokyo, starting point of all surveys of Japan and Korea, is several hundred feet southeast of its true position. This error was caused by the unusual shape of the land masses near Tokyo—high mountains on the north and west, deep sea to the south and east—that cause the transit measurements to be slightly off. Observing sites in Tenan, Korea, and Rebun Jima, Japan, had to be replotted on the map.

Pouring rain greeted the expedition at Wu-k'ang, China, about 35 miles west of Hangchow. The last of the seven expeditions to reach assigned observation sites, the party here is having to pay Chinese workers, hired to help pitch the expedition's camp, \$240,000 per day in Chinese currency.

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GENETICS

Marriage Barriers Produce Genetic Differences

➤ **RELIGIOUS** barriers to marriage have apparently helped produce hereditary differences in the population in things quite unconnected with religion, such as left-handedness, blood groupings, and ability to taste certain chemicals. A statistical study bringing out this point, made by Prof. David C. Rife of Ohio State University, Columbus, Ohio, is reported in the *American Journal of Physical Anthropology* (March).

The study was made on 1,850 students who registered for courses in genetics, over a period of four years. They were listed as Jews, Protestants and Catholics. A fourth group, racial rather than religious, was also included: there were 43 Negroes, all Protestants.

The marriage barrier between Jew and Gentile seems to be more nearly insurmountable than that between Catholic and Protestant, Prof. Rife states. In certain blood groupings, Jews stood out alone, while Catholics and Protestants were quite similar. Likewise, the percentage of left-handedness was much higher among the Jews: 15 for them as against only ten in both Protestants and Catholics. Fewest southpaws were found among the Negroes.

In reaction to the compound known as phenyl thiocarbamide, which is intensely bitter to some and tasteless to others, Catholics held low score for number of tasters and Negroes high, with Protestants and Jews in intermediate position.

Science News Letter, April 24, 1948

BOTANY

Water Hyacinth Seen as Possible Power Source

➤ **GAS** for power and fuel, in the world's warmer and wetter lands, may some day come from a plant that is now rated as about the world's worst floating weed—the water hyacinth.

This South American plant that now forms vast floating mats on rivers and lakes all the way from the Gulf coast of the U. S. A. to southern Asia, often hindering navigation, has been used by three scientists in England, D. G. Arbott, M. Ruhemann and V. A. Immerwahr, as basis for a fermentation process that produces a gas rich in methane and containing also some hydrogen.

They figure that to keep a hundred-kilowatt power plant going would re-

quire four tons of water hyacinth a day, chopped, boiled and inoculated with the right kind of bacteria. As anyone who has ever seen water hyacinth growing can easily testify, that would not be a particularly difficult job.

Cost of such a hundred-kilowatt plant, they calculate would be about \$100,000, and running expenses would amount to about \$40,000 a year. To meet these and amortize the cost of the plant, 8,000 hours' operation a year would be needed, with the current selling at the fairly high figure of five cents a kilowatt hour. This may not be economic at present, but if oil and other easily transportable fuels become scarce enough, we may yet see towns and plantations on tropical rivers lighted with current from water-hyacinth plants.

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GENERAL SCIENCE

STS Winners Pull Ahead Of Other Contestants

➤ **FOLLOW-UP** of the Science Talent Search contestants after six years shows that the winners of Westinghouse scholarships are pulling ahead of other contestants on the road to scientific achievement.

Winners of the 1942 contest and those receiving honorable mentions were compared with the others on ten points of achievement, Drs. Harold A. Edgerton and Stuart Henderson Britt, New York psychologists, and Dr. Ralph D. Norman of Princeton University reported to the Eastern Psychological Association meeting in Philadelphia.

Results showed that those who gained recognition, particularly the winners, are better on the following points: majoring in science in college; extent of education beyond high school; college grades; election to honorary societies; awards of scholarships and fellowships; and choice of future professional field.

Winners did not stand out as better, however, on the following points: things learned about science; proficiency in the use of special scientific apparatus; principal contributions to science; and election to professional societies.

The reason the winners did not excel on these last points also, the investigators believe, is because the war and war service delayed their progress, because of the difficulty in getting the information and because the winners as well as the others are still very young, it being only six years after their high school graduation.

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IN SCIENCE

INVENTION

New Antiseptic Cement Keeps Floors Germ-Free

➤ **CONCRETE** floors and walls are recognized as possible lurking-places for germs of trouble: athlete's foot and boils in gymnasiums, various diseases in hospitals, souring and spoilage in dairies and other food-handling places. To minimize these risks without the heavy expense and ceaseless trouble of waterproofing and disinfectant moppings, C. R. Amberg and W. J. Knapp of Alfred, N. Y., have developed a cement into which about one per cent of pentachlorophenol or some related antiseptic compound is mixed.

Concrete made with this cement, they state, has been proven virtually germ-free under actual working conditions, when other sections of the same floors, in which untreated cement was used, were swarming with germs. U. S. patent 2,439,440, just issued on this invention, has been assigned to the North American Cement Corporation.

Science News Letter, April 24, 1948

CHEMISTRY

Fungicidal Dressings Make Leather Safe from Mildew

➤ **LEATHER** goods, treated with a new dressing developed by the National Bureau of Standards, is safe from mildew and other fungi even under tropical conditions.

The important ingredients of the new dressing are 20% of a mixture of equal parts of neatsfoot oil and mineral oil, 2% paranitrophenol, 10% cyclohexanone, and 68% either perchloroethylene or Stoddard's solvent. The first preserves flexibility, and the second is the fungicide. The perchloroethylene is preferred over Stoddard's solvent because it is non-inflammable.

This formula is now being used by the Office of the Quartermaster General of the Army for the treatment of shoes and other leather items which are to be placed in storage. It is also being used for reconditioning combat boots that have become mildewed and stiffened in storage.

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ZOOLOGY

Bushy-Tailed Cloud Rat Is First Born in Captivity

See Front Cover

➤ THE birth of what is believed to be the first bushy-tailed cloud rat ever to be born in captivity was recently announced by the Philadelphia Zoo.

It is almost a libel to call *Crateromys schadenbergi* a rat. True, it does belong to the rodent tribe, but it is as large as an opossum and its fur is soft and lovely. The animal is indeed bushy-tailed and the "cloud" part of its name comes from the fact that it inhabits damp, misty mountains.

The species is found nowhere except at high elevations in the northern part of Luzon, Philippine Islands. Several specimens were captured there last year by Charles H. Wharton, returning G. I., and they were the first ever to be exhibited in zoos.

The father has buffy gray fur with a white collar and feet, but the mother is jet black above and dark gray below. The baby favors both, for it is black but also shows the light markings of its father, as shown on the cover of this week's SCIENCE NEWS LETTER.

Science News Letter, April 24, 1948

BOTANY

Guggenheim Fellows Seek Abroad for Useful Plants

➤ FOREIGN lands will be combed for plants, seeds and botanical facts that will benefit American agriculture by several of the newly-appointed Guggenheim Fellows.

Dr. Harold P. Olmo of the University of California will study native fruits and nuts of Iran and Afghanistan, to find new varieties suitable for use on our Pacific coast. His colleague, Dr. Charles M. Rick, Jr., will go to the Andes in search of tomato species that can be crossed with American tomatoes to increase their yield. A third California scientist, Dr. Adriance S. Foster, will work in the Amazon basin on the anatomy and development of certain tropical plants.

Roy Wesley Nixon, associate horticulturist of the U. S. Date Garden at Indio,

Calif., will go to North Africa to study date varieties cultivated there, with a view to improving date growing in the United States. Several other newly-appointed Fellows will carry on botanical research "at home" in North America.

The Guggenheim Fellowship Fund, now amounting to more than \$29,000,000, was founded in 1925 by the late U. S. Senator Simon Guggenheim and his wife as a memorial to their son, John Simon Guggenheim, who died as a young man in 1922. The fellowships are distributed without distinction of race, color or creed, to scholars and artists judged, on the basis of past work, to be most likely to use them productively in scientific research or creative work in literature and the arts.

Science News Letter, April 24, 1948

AERONAUTICS

British Helicopter Sells For "Well Below" \$10,000

➤ A TWO-SEAT helicopter, which will sell for "well below" \$10,000, is near completion by the British Cierva company. It is designed both as a trainer and for private flying.

This aircraft, which weighs only 1,200 pounds with "two-up," will be known as the W.14 Skeeter. The simplicity of its design and the ease with which it can be flown will appeal strongly to private flyers, the manufacturers believe. The same company will soon have in the air its new 24-seat helicopter, the W.11 Air Horse, which is believed to be the world's largest helicopter. America has at least two types of 10-passenger helicopters.

Science News Letter, April 24, 1948

PUBLIC HEALTH

Atomic Bombing Effects On Food Need Studying

➤ THE need for more knowledge of the effects of an atomic bomb explosion on meat, milk and forage crops is stressed in a report from the American Veterinary Medical Association.

A population could "conceivably" survive an atomic bomb attack only to face slow starvation because so much of its food supply had become contaminated with dangerous radiation, the association stated.

Veterinary Corps personnel and civilian veterinarians must become the nation's first line of defense against this danger, Brig. Gen. James A. McCallam, chief of the Army Veterinary Corps, said.

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ANTHROPOLOGY

Skeleton Found in Mexico Is Not as Old as Hoped

➤ THERE were high hopes for a few days that another "old man of Mexico" had been unearthed, along with a mastodon tusk, this time in the Oaxaca region of Mexico, famed for the extraordinary Monte Alban tombs.

But this known skeleton, unlike the 10,000-year-old Tepexpan man discovered last year, has proved to be much more recent, probably one of the Mixteca people who built the tombs.

When the skeleton was found, it seemed to be in a geological level that would make it very old, but later there were found in the same deposits pottery of the Mixtecan sort and also jade which would date it in the relatively recent prehistoric era.

Science News Letter, April 24, 1948

PSYCHOLOGY

Women Poorer "Gossips" Than Men, Study Shows

➤ WOMEN make poorer gossips than men, at least when the gossip reflects on women. A modification of the old game of gossip gave this result. The experimental game was conducted by Dr. Thelma G. Alper, of Harvard University, Dr. Leo Postman, of the University of Indiana, and Dr. Sheldon J. Korchin, of the Philadelphia Veterans Administration Clinic.

In the psychological gossip game, one man read a passage of about 350 words. Ten minutes later he wrote down what he had read. Then the next man read the first man's written report and after ten minutes wrote his version. Thus it passed through the group of six men. The same process was gone through with six women.

The material dealt with co-education and the relative merits of men and women students. It was intentionally provocative in language. Although it included statements both for and against men and for and against women, the general tone was derogatory to women students.

The girls showed, in general, poorer retention than the men students. But what surprised the investigators was that the girls had a tendency to emphasize the parts that were derogatory to their own sex.

These findings were reported before the Eastern Psychological Association meeting in Philadelphia.

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ASTRONOMY

Birth of Our Solar System

Dust Cloud theory suggests that planets were created following the collapse of an enormous cloud of cosmic dust and gas.

By MARTHA G. MORROW

➤ BEING in a fog will help you understand science's latest explanation of how the sun and its system of planets—including the earth—were born.

Imagine yourself high on a mountain top, completely lost in a vast cloud. Suddenly the supersaturated atmosphere condenses and rain begins to fall. Tiny droplets of water spatter at your feet.

But occasionally a gust of wind catches the falling drops. They are carried upwards, away from the earth.

Billions of years ago currents such as this may have kept the cosmic dust and gas from which the earth and other planets were being formed from falling into the center, destined to become the sun.

The complete collapse of a stupendous cloud of cosmic dust and gas some 5,500,000,000,000 miles across, but of about the same mass as our sun today, was responsible for our solar system. This is the suggestion of Dr. Fred L. Whipple of Harvard College Observatory. Our expanded sun probably did collide with other partly-formed clouds, he believes, but at a very early stage in its creation.

Subclouds Were Active

At first the entire system whirled but little, if at all. But the smaller subclouds within it were not so quiet. They moved in parabolic paths and were continually sliding by or bumping into one another.

Then slowly the cloud began to collapse. Many millions of years passed before it completed even the first stage of contraction. But as the cloud became smaller, it shrank in size at a more rapid rate. The cosmic dust and gas became concentrated at its core, they grew hot and began to glow.

The planets were probably all formed before the cloud contracted enough to fit within the orbit of Mercury, the innermost planet. They may have developed in a smaller cloud of dust and gas captured by the large cloud. Or, more likely, they were created in a dusty gaseous stream within the parent cloud.

As the great cloud shrank, the planets grew in size. Moving about within the parent cloud, they picked up more cosmic matter. Spiraling inwards, they finally arrived at about the same distances from the sun that they keep today.

Because of their common motion about the core of the cloud, the new-born planets continued to move in about the same plane and in the same direction. As they grew larger by picking up more cloud material, their orbits smoothed out and became more nearly circular.

Father of New Theory

The father of this scientific theory of the birth of the solar system is a meteor authority who has a comet or two named after him. One of the group of world-famous Harvard astronomers directed by Dr. Harlow Shapley, Dr. Whipple is an enthusiastic and energetic researcher on the portion of the sky that is closest to our own earth, our own little part of the cosmos.

Man has puzzled for thousands of years over how the earth, its sister planets and the sun were created.

This question today is answered in several ways. For some, the solar system was originally a nebula; for others it was once a star, even a double or triple star. Some astronomers believe the solar system is the result of a stellar accident of gigantic proportions; others feel it developed while the main body shrank as it grew older.

The oldest hypothesis of importance today is that advanced by the German philosopher, I. Kant, who in the middle of the eighteenth century suggested that the solar system was formed from a nebula. The French astronomer P. S. Laplace put this Nebular Hypothesis into scientific terms.

The solar system, according to this theory, was once a slowly rotating nebula that gradually cooled and contracted under the force of its own gravitation. As it condensed, rings of matter split off around the equator and formed planets. These all move in the same direction and have nearly circular orbits, almost in the same plane. What was left gathered itself into a fiery sun.

Although this theory accounted for many of the obvious features of the solar system and was modified to explain others, several outstanding objections remain. An extended tenuous ring of this type could not split off from the slowly rotating nebula and probably could not pull itself together to form a single body. It might form a ring like that surrounding Saturn or a swarm of minor planets or asteroids, but not a planet. Also the major planets have almost all the angular momentum of the solar system—98% of the total.

Another theory, the Planetesimal Hypothesis, was offered about 1900 by two scientists, then at the University of Chicago, the late Dr. T. C. Chamberlin, and Dr. F. R. Moulton, now secretary of the American Association for the Advancement of Science. For them the sun was once an isolated star without planets. But long, long ago another star passed close enough to the sun to tear great masses of matter out of it.

When the other star rushed away, some of the ejected matter fell back into the sun, some followed the star into space, but much of it was left circulating about the sun in elliptic orbits. The planets, which grew as they picked up more cosmic material, are mute evidence of the collision.

Tidal Theory Differs

Details of what happened after the celestial accident differ in the Tidal Theory offered by two Englishmen, Sir James Jeans and Dr. Harold Jeffreys. They agree that material was forced from the sun by another star either approaching the sun close enough to raise great tides on it or actually sideswiping the sun as it rushed past. But they conclude that the matter drawn out of the sun formed an elongated stream or cigar-shaped filament which broke up crosswise. These bodies from the start were nearly as massive as the planets today.

But astronomers were not entirely satisfied with this theory either. A serious dynamical objection was raised by Dr. Henry Norris Russell of Princeton University Observatory who figured out that most of the material ejected from the sun would be dragged to much smaller distances than the planets' present orbits and would be left revolving much less rapidly than is the case today.

Hot gases drawn out into a gigantic filament by such a glancing encounter between stars would explode just as a deep sea fish bursts when brought to the surface and released from the high pressure surrounding it, reasoned Dr. Lyman Spitzer, Jr., also of Princeton. Instead of forming solid bodies like the planets, his calculations showed, a stellar encounter would simply produce an extended gaseous nebula around one or more of the stars involved.

Theory Under Fire

As you would expect, critical astronomers are already trying to puncture holes in the new Dust Cloud theory, tentatively suggested about a year ago. During the last year it has been further developed, and many details cleared up. Today Dr. Whipple spends much of his spare time dreaming and figuring out ways to make the hypothesis answer all questions.

The planets, he elaborates, were given a final "bath of flame," just before they developed as we know them today. This was particularly true of Mercury and Venus, nearer the sun than the earth.

This intense heat probably lasted only a few years. But during this time it burned up whatever atmosphere may have surrounded Mercury and Venus, and dried out much of that on the more

distant planets. Those nearer the sun, particularly Mercury, also probably shriveled up through loss of considerable matter as well as atmosphere.

The earth had long ceased to be gaseous when it was submitted to this intense heat. A completely gaseous earth could probably not have survived. Instead it probably was molten during this phase of its development.

As more is learned about the universe around us, the greater will be our knowledge of how our own solar system was born. When we look at one of those small, dense dust clouds that fascinate Dutch-born Dr. Bart J. Bok of Harvard Observatory, we may be watching the birth of another solar system. When Dr. Spitzer figures out another step in the process by which individual atoms stick together to form minute solid particles, he may be explaining how our own solar system began.

Exactly what happened 2,000,000,000 to 3,000,000,000 years ago, when our solar system was created, may not be known during our lifetime. The Dust Cloud theory probably isn't the final answer. But it may be another stone in the path that leads to a completely satisfactory theory. An explanation of the evolution of the solar system is itself slowly being evolved.

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animals' skin. At the time of the report it had been given to 85 cholera patients in 27 villages.

Giving the drug to other residents of the villages kept them from becoming infected. The Indian scientists emphasize the importance of this preventive aspect of the drug in addition to its curative value.

Development of this new anti-cholera drug started with a finding of Dr. Bhatnagar's in 1939. This was that cholera germs were killed in the test tube in less than half an hour by a 10% solution of hexa-methylene-tetra-amine in normal salt solution. Further studies, although interrupted by the war, led to developments of hopeful compounds made by linking hexamines to a sulfa drug.

"A chance conversation with the scientific department of Ciba," the Swiss drug manufacturing house at Basle, the scientists report, led to the Swiss firm developing the compound now known as "6257."

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AGRICULTURE

World Food Crisis Eased FAO Committee Reports

➤ THE hungry world is not suddenly going to be well fed, but there seem to be fair indications that it will not have to pull its belt in quite so tight in 1948 as it did in 1947. The report of the International Emergency Food Committee of FAO lists three developments, unforeseen six months ago, that have eased the world food crisis "and warrant cautious optimism for the future." They are:

1. An unusually mild winter in Europe;
2. Record harvests in Australia, which

MEDICINE

New Drug Checks Cholera

This sulfa drug, known as "6257", is a powerful killer of cholera germs. It also protects the healthy from infection, Indian scientists find.

➤ A NEW sulfa drug that cut cholera deaths from more than 60 to only four per hundred cases is announced by four Indian scientists in the journal, *Nature*, (March 13). The scientists are Drs. S. S. Bhatnagar, F. Fernandes, J. De Sa and P. V. Divekar of St. Xavier's College, Bombay.

The drug is known as "6257" for short. It is a condensation product of two molecules of a sulfa drug, 2 p-aminobenzene sulfonamidothiazole, and three molecules of formaldehyde.

Preliminary tests showed that it was a powerful killer of cholera germs in the test tube. When injected under the skin of mice it gave 100% protection against cholera.

It was then tried in patients in the

Tanjore District of South India where there were cases of Asiatic cholera in many villages. The patients were treated in their homes without any other medical aid. Most of them were under-nourished women and children who had been vomiting, having diarrhea and suppression of kidney function.

Vomiting was invariably stopped and the diarrhea much reduced within six hours after treatment with the new sulfa drug was started. Kidney functioning was restored by the ninth hour. By the fifth day, the cholera germs were absent from the body wastes. The drug was given by mouth morning and evening for five days, although when given by mouth to the mice it had been less effective than when injected under the

PSYCHOLOGICAL ATLAS

By DAVID KATZ, Prof. of Psychology,
Stockholm University

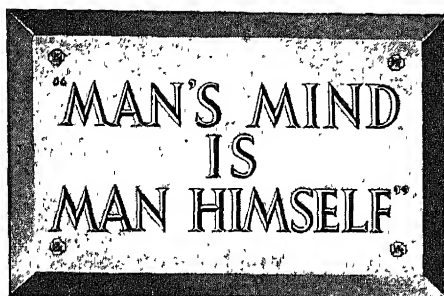
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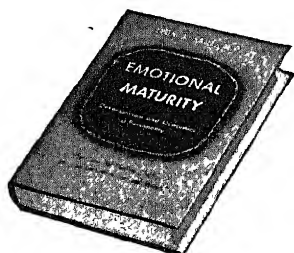
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are resulting in greatly expanded exports of cereals;

3. Doubling of monthly grain exports from Argentina, supported by much larger crop yields than could normally be counted upon.

A fourth, but expected, factor is the ability of the USSR to make substantial exports of cereals. Russian agricultural authorities are also quoted as promising increased food exports if the crop season continues favorable.

The mild weather in Europe helped not only through lessening of direct food demands but through improvement of winter pasture for cattle, thereby decreasing the need for diversion of grain for feeding purposes and at the same time increasing the supply of dairy products.

While a repetition of the immense wheat crop of 1947 in the United States is not expected this year, prospects for a continuation of large supplies of wheat from the Southern Hemisphere seem good. It also seems reasonable to expect an improvement on the 1947 corn crop in this country.

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CHEMISTRY

Revivifying Bone Char

➤ BONE char research by the National Bureau of Standards is of particular interest to sugar refiners but the public may benefit if lower prices for this important food result. Vast quantities of bone char are used in filtering at the refineries. The principal problem is how to revivify it, that is, how to treat it so that it can be used over and over again.

Bone char, known also as animal black and animal charcoal, is obtained by the destructive distillation of organic matter at high temperature.

Although large-scale revivification of bone char by a process involving successive washing, drying, and heating has been employed in cane sugar refineries for about 50 years, improvements in revivification methods have not kept pace with modern trends in industrial operations, the Bureau states. The gradual exhaustion of adsorptive properties with use and the small loss of dust formed must be compensated for by a small and steady addition of new char.

Bone char is a granular solid adsorbent used in great quantities for the decolorization and purification of raw sugar. This is accomplished by passing the

Do You Know?

The word *dinosaur*, loosely applied to any ancient large reptile, is correctly applicable to two orders of reptiles with scientific names, Saurischia and Ornithischia, one of which means "reptile hips" and the other "bird hips."

In the home *oil-burner* furnace, light-weight firebrick is said to conserve fuel; oil does not burn completely until the firebox is hot and the light-weight brick heats up more quickly than ordinary firebrick.

Collars of steel were worn by men in colonial days, it is said; they were enameled white and could be instantly cleaned with a wet rag.

A *camera* that contains a tiny furnace has been developed to take closeup pictures of hot metals.

A *radar-proof container* for photoflash bulbs has been developed.

An *egg* has been called one of nature's best packages of food value.

sugar liquor through a number of filters. In some refineries some of these filters are 10 feet in diameter and 20 feet deep. The char becomes exhausted after repeated use. There is a reduction in surface area of the granules.

The Bureau's studies are to obtain increased understanding of the properties of the commercial solid adsorbents, particularly bone char, and their basic behavior as related to structure. It is a long-range cooperative program of research initiated in 1939 and supported by sugar refiners and bone char manufacturers. It is under the direction of Dr. Victor R. Deitz of the Bureau staff.

The structure of bone char has been investigated by means of X-ray diffraction spectra; electron micrographs; density determinations; measurements of surface area available to known gases; chemical analysis; and studies of specific heat, heats of wetting, and heats of combustion. Complete information on the structure of the revivified char delivered to the filter and that of the exhausted char after filtration is necessary to determine the over-all efficiency of revivification.

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SENIORS OF 1949

Start Now on YOUR SCIENTIFIC PROJECT

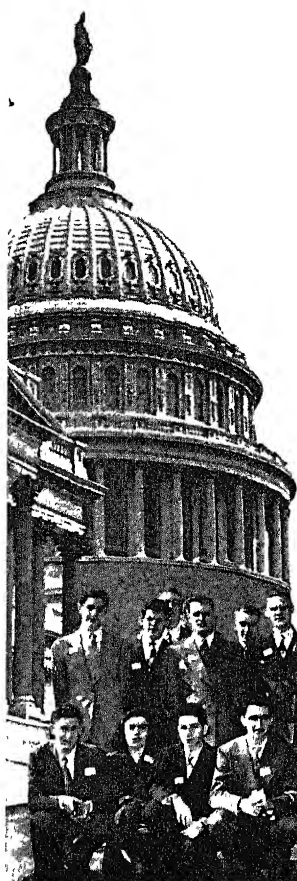
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- 2 Whatever your project may be—read about it. Learn what has already been done. It is often desirable to repeat previous experiments, but it should be done deliberately and for a purpose.
- 3 Write what you did, not merely what you read. Tell it in simple language; follow it through step by step. Then tell what you observed as a result of your experiments, and what conclusions you draw from these observations.
- 4 Fancy writing has no place in science. There has been great writing in the sciences but it is the greatness of strength and simplicity.

WRITE AN ESSAY of about 1,000 words on the subject, "MY SCIENTIFIC PROJECT." Your essay should tell what you are doing or plan to do in science in the way of experimentation or other research activity. It should be original and creative in character. Now, before the school year ends, is the time for high school seniors of 1949 to get started on science projects. With an early start you can plan a project, carry it through more carefully, write a better essay on it. Next December take an examination which tests your ability rather than your fund of information. Supply your school with information about yourself to be sent in with your essay and examination papers.

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Mushroom Growth

➤ MUSHROOMS, puffballs and other fleshy fungi multiply before our eyes as spring warms up and showers become more numerous. We never quite get over the feeling our great-grandfathers had, that there was something elfin, preternatural if not actually supernatural, about the sudden appearance of these strange growths. Yestereven they were not here; this morning they are all over the lawn like the tents of a fairy army; whence came they so suddenly, if the Little People didn't bring them?

Alas for our fancies, mushrooms and their kin do not grow as quickly as their sudden appearance might lead us to believe. Their real growth is, if anything, slower than that of most other kinds of plants, and always remains hidden.

You can get an idea of this hidden growth by carefully running your fingers into the loose mold of the forest floor where mushrooms are growing and lifting some of it gently, along with a mushroom or two. From the base of the stalk you will find white cottony strands running out, rapidly branching

and re-branching like roots, only not nearly as strong as even the weakest roots. The ultimate branchlets are glistening white threads, which may even be so fine that a microscope is needed to detect them.

These threads are the real body of the mushroom; the conspicuous, curiously-shaped overground body is only a structure that produces the reproductive cells, the spores, and sows them on the wind for distribution. The underground threads are what feed on dead leaves and wood, on anything dead in the soil, and in some species even parasitically on other plants that are still living. These threads are known to botanists as hyphae; a mass of such hyphae is called a mycelium.

The mycelium grows and spreads sometimes for several years, with no sign above ground. Then, when conditions become right for reproduction, the "buttons" that will eventually become the fully expanded mushrooms begin to form, just beneath the surface. They are like embryos, with all adult

parts represented, but in small size and tightly packed. Finally, warmth and wetness induce them to take in water at a terrific rate. They expand accordingly, and thus pop up overnight. But the silent, unseen preparations for this dramatic event have always been a matter of long, slow preparation.

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Science Service Radio

➤ LISTEN in to a discussion on "The Future of the Nation's Health" on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p.m. EDT Saturday, May 1. Mr. Oscar R. Ewing, Federal Security Administrator, will be the guest of Mr. Watson Davis, Director of Science Service. Mr. Ewing will discuss the purpose of the National Health Assembly, due to open the day of the broadcast.

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AEONAUTICS

Jet Planes Need Cooling

Some means of refrigeration is required to cool the pilot-cabins in fast jet-propelled airplanes, engineers are told.

➤ PILOT-CABIN cooling is necessary with jet-propelled aircraft capable of flight speeds of 500 miles an hour or over, the Society of Automotive Engineers was told by D. O. Moeller and O. Andrew Sanne of Stratos Corporation. Flight at speeds over the 600 miles-per-hour mark under extreme temperature conditions requires some means of refrigeration, they said, to make the cabin endurable for the crew members.

The heat comes from the outside of the plane—even when traveling high above the earth where the atmospheric temperatures may be well below zero Fahrenheit. It forms in the so-called boundary layer of air next to the plane which passes over the craft at a lower velocity than the outer air. It is due to the conversion of the kinetic energy of the air stream into heat. Part of this heat is dissipated to the air stream, they explained, but part passes to the cabin walls and raises the inside temperature.

In addition to this heat, there is also a heat input from electrical equipment,

crew members, and solar radiation. It is not surprising, therefore, they stated, that even at high altitudes operation of the cooling system is necessary.

In a jet-propelled plane equipped with an expansion-turbine type cabin cooling system, air taken from the jet-engine compressor is the source of cabin ventilation. Two systems of cooling the air are used, one a simple system, the other the so-called bootstrap method. In the simple system the air is cooled by passing through a heat-exchanger, which uses ram air as the cooling medium, then is cooled further by expansion through the turbine.

The bootstrap system utilizes two heat exchangers combined with a centrifugal compressor and an expansion turbine, they stated. The air taken from the engine is passed through the first heat exchanger and then is compressed in the centrifugal to an appreciably higher pressure. The air is cooled in the second heat exchanger and then is finally cooled by expansion in the turbine.

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The ever-increasing speeds of military aircraft will require that planning and development of cooling equipment keep

abreast of the aircraft requirements. The development of high air speeds and better cooling systems should be parallel.

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Books of the Week

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THE ART OF CHINESE PAPER FOLDING FOR YOUNG AND OLD—Maying Soong—*Harcourt, Brace*, 132 p., illus., \$2.50. Instructions and diagrams for making a variety of amusing and useful objects from paper, without use of scissors or paste.

BEE'S' WAYS—George DeClyver Curtis—*Houghton Mifflin*, 240 p., illus., \$2.75. Amusing reading, useful for beekeepers or those who want to be—interesting to others.

BIBLIOGRAPHIC INDEX OF PERMIAN INVERTEBRATES—Carl C. Branson—*Geological Society of America*, 1049 p., \$9.50.

CHAMBERS' MINERALOGICAL DICTIONARY—*Chemical Publishing Co.*, 47 p., 40 colored pl., \$4.75. A convenient and beautiful book which would aid in the identification of stones.

CHEMICALS, HUMUS, AND THE SOIL: A Simple Presentation of Contemporary Knowledge and Opinions About Fertilizers, Manures and Soil Fertility—Donald P. Hopkins—*Chemical Publishing Co.*, 358 p., \$8.50. Intended for the man who works with the soil.

COLLOID CHEMISTRY—Robert J. Hartman—*Houghton Mifflin*, 2d ed., 572 p., illus., \$6.50. Not only for students of advanced chemistry but for students of other sciences who need a knowledge of this field.

ECONOMICS OF PERSONAL AIRPLANE OPERATION—W. J. Skinner—*Oregon State Engineering Experiment Station*, 46 p., illus., paper, 25 cents.

EVOLUTION OF THE HORSE BRAIN—Tilly Edinger—*Geological Society of America*, 177 p., illus., \$2.00.

A FIELD GUIDE TO THE BIRDS: Giving Field Marks of All Species Found East of the Rockies—Roger Tory Peterson—*Houghton Mifflin*, 2d rev. ed., 290 p., illus., \$3.50. A complete, authoritative book, but held to convenient pocket size. Contains flight silhouettes as an aid in identification.

A FIELD GUIDE TO THE SHELLS OF OUR ATLANTIC COAST—Percy A. Morris—*Houghton Mifflin*, 190 p., illus., \$3.50. If you are planning a vacation at the seashore, don't forget to tuck in this convenient little handbook.

FREQUENCY MODULATION: VOLUME I—Alfred N. Goldsmith and others, Eds.—*Radio Corporation of America*, 515 p., illus., \$2.50. A collection of technical papers of interest especially to scientists and engineers.

THE FREUDIAN PSYCHOLOGY AND VEBLEN'S SOCIAL THEORY—Louis Schneider—*King's Crown Press*, 270 p., \$3.25. Philosophers and political scientists may be interested in this unusual comparison.

GROWTH OF PLANTS: Twenty Years' Research at Boyce Thompson Institute—William Crocker—*Reinhold*, 459 p., illus., \$10.00. A critical summary of a wide variety of problems in plant research ranging from the storage of seeds to the control of color in potato chips.

INDUSTRIAL AND CITY WASTES—Fred Merzfeld, W. B. Bollen, and F. C. Kachelhoffer—*Oregon State Engineering Experiment Station*, 56 p., illus., paper, 40 cents.

JET PROPULSION IN COMMERCIAL AIR TRANSPORTATION—Robert E. Hage—*Princeton University Press*, 91 p., illus., paper, \$1.50. An authoritative answer to the question, "Can jet propulsion, which has so revolutionized military aviation, be applied to advantage in civil air transportation?"

LIVING WITH SCIENCE—George W. Fowler, Morton C. Collister and Ernest L. Thurston—*Iroquois*, 544 p., illus., \$2.56. A general science text for the eighth year.

LOUIS PASTEUR—Laura N. Wood—*Messner*, 218 p., illus., \$2.75. The biography of a great scientist.

OVERFIRE JETS IN ACTION FOR SMOKE ABATEMENT—*Bituminous Coal Research, Inc.*, 16 p., illus., paper, 25 cents. For commercial and industrial stationary plants, railroads and steamboats.

THE MAN-EATING LEOPARD OF RUDRAPRANAG—Jim Corbett—*Oxford University Press*, 188 p., \$2.50. The story of a two-year hunt for an animal credited officially with killing 125 human beings.

THE MEANING OF WORDS: Analyzed Into Words and Unverbal Things, and Unverbal Things Classified into Intellections, Sensations and Emotions—Alexander Bryan Johnson with introduction by Irving J. Lee—*Chamberlin*, 256 p., \$3.00. Originally published in 1854, this book was a forerunner of semantics.

THE NEW BABY—Ruth and Harold Shane—*Simon and Schuster*, illus., 25 cents. A charming book in drawings and story intended help the young older brother or sister to enjoy the coming of the new addition to the family. Incidentally, the parents will find here useful hints on the handling of the situation to avoid hurt to the "Mike's" of this world.

PERSIAN ART AND DESIGN INFLUENCES FROM THE NEAR AND MIDDLE EAST—Arthur Upham Pope—*Sudho*, illus., paper, \$2.00. Tracing the influence of Persian art in the modern world and on American textile and other design.

PREPARATION AND CHARACTERISTICS OF SOLID LUMINESCENT MATERIALS—Gorton R. Fonda and Frederick Seitz, Eds.—*Wiley*, 459 p., illus., \$5.00. A collection of important technical papers.

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UNITED STATES ASSOCIATIONS IN WORLD TRADE AND AFFAIRS—Office of Domestic Commerce—*Govt. Printing Office*, 125 p., illus., paper, 30 cents. Directory of 900 organizations which have a special interest in foreign trade, international affairs or world peace. Also text and statistics on the foreign trade of the U. S. and other nations.

THE USE OF AIRCRAFT IN THE CONTROL OF MOSQUITOES—*American Mosquito Control Association*, 46 p., 45 pl., paper, 75 cents. Information on when, where, and how aircraft may properly be used to distribute insecticides, especially DDT.

THE WORLD BOOK ENCYCLOPEDIA, 1948 ANNUAL SUPPLEMENT—J. Morris Jones, Ed.—*Quarrie*, 224 p., illus., paper, \$1.00. Reviewing important events of 1947.

WORLD WORDS: Recommended Pronunciations—W. Cabell Greet—*Columbia University Press*, 2d rev. ed., 608 p., \$6.75. A way of pronouncing the names in the news, including Japanese and Chinese places, originally developed for the use of broadcasters.

YOU AND YOUR DOCTOR: A Frank Discussion of Group Medical Practice and Other Modern Trends in American Medicine—Benjamin F. Miller—*McGraw-Hill*, 183 p., \$2.75. A book for laymen intended to give him the background for an understanding of this difficult and important problem.

Science News Letter, April 24, 1948

Charles

DARWIN

and the
Voyage of the Beagle

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⚙️ **SHOWER CURTAIN** weights, available in a variety of colors, are three-inch tubes with a pair of prongs to attach them horizontally to the lower end of the curtains. Made of a non-corrosive material, they are non-injurious to the fabric and keep the curtains hanging uniformly.

Science News Letter, April 24, 1948

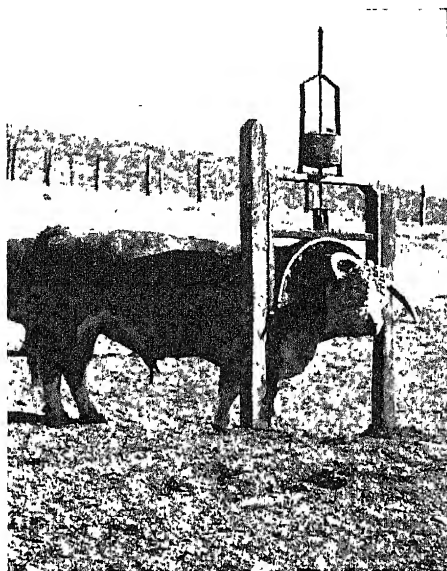
⚙️ **FISHING KIT**, a pocket-sized unit, is composed of two one-inch tubes, six inches long, of transparent plastic with a flat section of the same material between and connecting them. A fishing line may be wound endwise around this flat section, and the tubes used for carrying hooks, lures and sinkers.

Science News Letter, April 24, 1948

⚙️ **STEAM JETS**, to introduce air into locomotives and furnaces above the burning coal, assure the complete combustion of the volatile gases in the firebox and eliminate the discharge of dense smoke. They provide an inexpensive way to get more heat from the fuel and to get rid of the smoke nuisance.

Science News Letter, April 24, 1948

⚙️ **BACK-SCRATCHER** for cattle, shown in the picture, permits the animal to relieve irritation from grubs and other insect pests and at the same time apply an effective insecticide. A somewhat



similar device applies protection oil to backs, sides and bellies of hogs.

Science News Letter, April 24, 1948

⚙️ **GLASS CUTTER** made of Kennametal, a tungsten-titanium carbide, has an extremely hard and durable cutting edge and is designed for use in place of the ordinary triangular file. It is a three-inch blade in a convenient wood handle.

Science News Letter, April 24, 1948

⚙️ **ELECTRIC MASK** to cover the

frontal area of the head and cheeks, for use in heat-treatments of head colds, facial neuralgia, migraine headaches and pain from sinusitis, may be worn sitting up or in bed. Heat is controlled at 140 degrees Fahrenheit by a thermostat, and the heat may be localized to an area prescribed by a physician.

Science News Letter, April 24, 1948

⚙️ **FRUIT CONVEYOR**, to aid in fruit picking, is a funnel-like device strapped to the wrist and an attached tube which leads to a basket. In the upright position of the hands in picking, the plucked fruit is merely dropped to fall into the funnel from which it rolls through the tube to the receptacle.

Science News Letter, April 24, 1948

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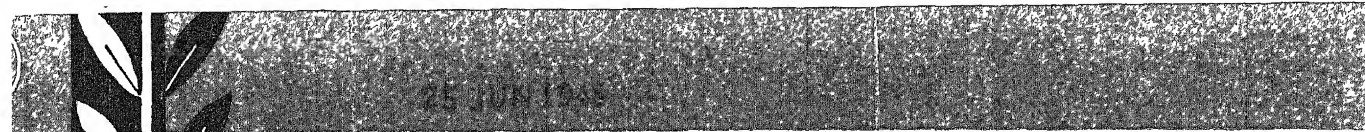
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Photographs: Cover, Philadelphia Zoological Society; p. 259, National Cancer Institute; p. 261, General Electric Co.; p. 262, 263, Sloan-Kettering Institute of Cancer Research.

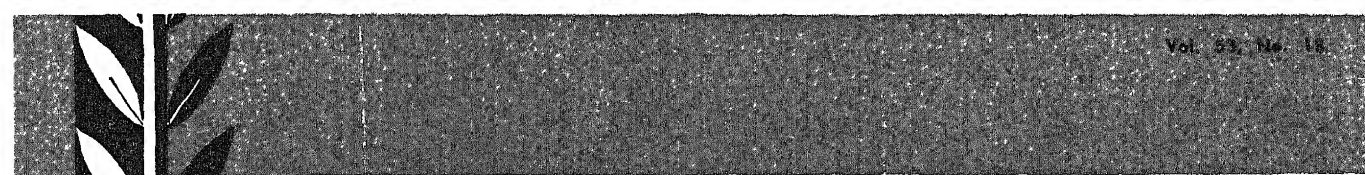
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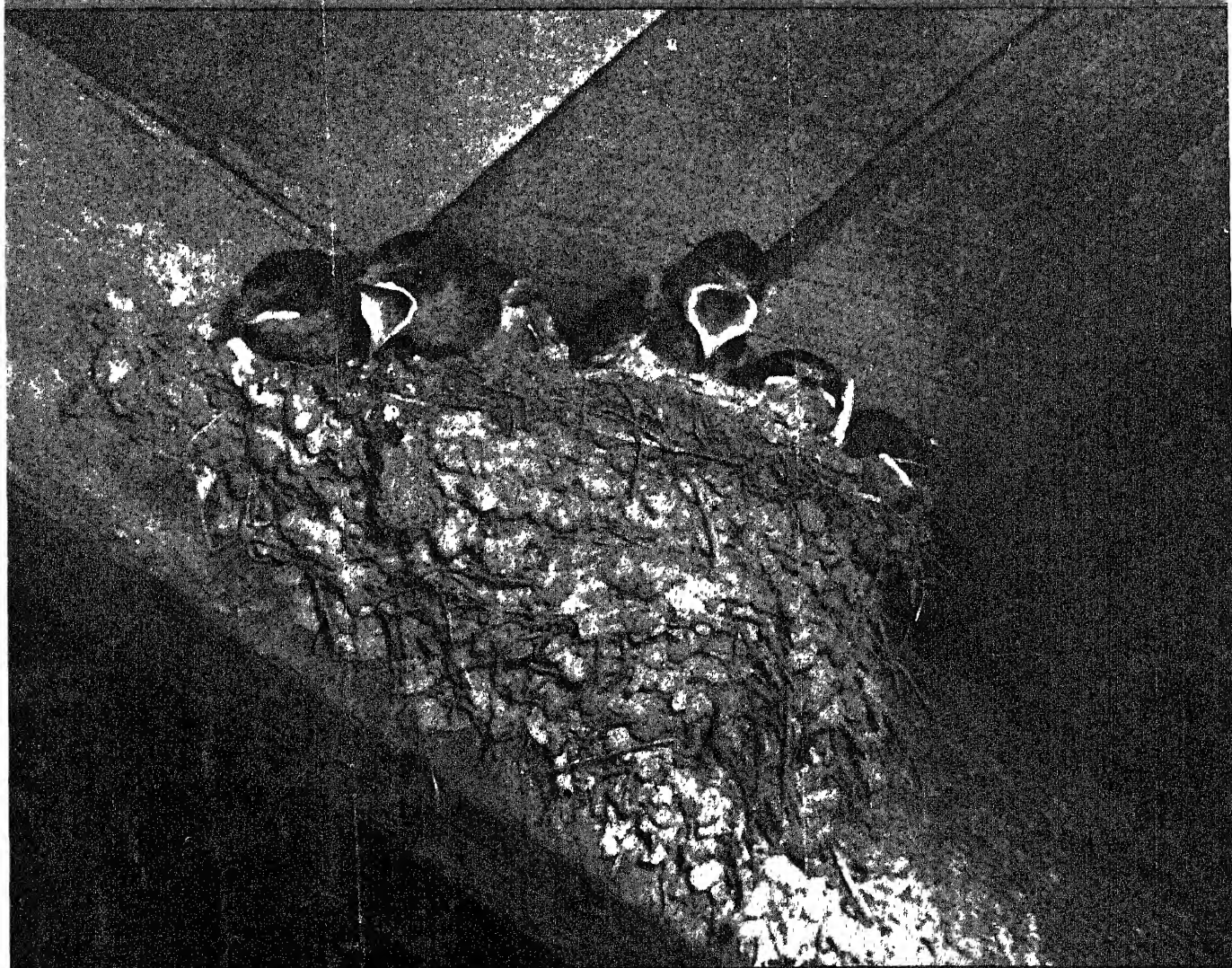
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SCIENCE NEWS LETTER



THE WEEKLY SUMMARY OF CURRENT SCIENCE • MAY 1, 1948



University of California
Division of Agricultural Sciences
Berkeley, California

Adobe Nursery

See Page 286

A SCIENCE SERVICE PUBLICATION

PHYSICS-PHYSIOLOGY

Danger of Unheard Noise

Assessment of the extent of possible bodily damage from airborne ultrasonics must be made. Scientist warns against wild rumors which might hamper progress.

➤ THE danger to pilots from unheard noise and vibrations of faster-than-sound planes are matters of "grave concern," Dr. Hallowell Davis, director of research at the Central Institute for the Deaf, St. Louis, warned at the meeting in Washington of the Acoustical Society of America.

Dr. Davis warned at the same time against rumors, "weird stories" and "wild observations" of damage from sound that the human ear can't hear. These can arouse public fear, he charged, and seriously hamper progress.

It is possible, for example, that ultrasonic sound encountered in jet or turbo-jet planes could burst the blood vessels in the brain without any warning discomfort or pain. But there is no proof of such danger, he stated.

Small animals, he stated, may be literally cooked to death by the heating caused by high-intensity ultrasonics. But this does not happen without warning. Their sense organs give them correct information as to the immediate situation, through the heating of their fur, though they do not know the cause of the danger.

Injuries to the lungs reported as resulting from "blast" from explosions and from sustained very high intensity sound are examples, Dr. Davis said, of supersonic damage to bodily structures.

Disruption of the wings of insects is another example of ultrasonic damage.

The energy of inaudible sound can cause chemical and colloidal effects such as underlie the killing of bacteria, the aging of whisky and the homogenization of milk. These effects may also be produced in the human body. But these possibilities, Dr. Davis said, have not yet been assessed. Man may be protected from any such effects from airborne ultrasonics by their effective reflection from his skin.

Both the discomfort threshold and the danger zone for man for the sound frequency spectrum up to at least 200,000 cycles per second need to be determined, Dr. Davis said. Engineers need this information for the safe design of high-performance aircraft and other mechanisms that produce high-intensity vibratory energy.

Ultrasonic sound is the kind of vibration that the human ear can not hear. It is the range of vibration between 15,000 and 500,000,000 cycles per second. Supersonics is sometimes the name given to such high-rate vibrations, but due to the increase in speeds beyond the speed of sound (about 760 miles per hour) the term supersonics is now being applied to those speeds rather than the high rate of sound vibrations, which are called ultrasonics.

Science News Letter, May 1, 1948

CHEMISTRY

Secret of Gasoline Jelly

➤ THE war-time secret of what makes gasoline thicken into a jelly for use as a liquid incendiary in flame-throwers or fire bombs was revealed.

It is a soap made with aluminum instead of the usual chemicals used in ordinary soap, Dr. Walter H. C. Rueggeberg of the Army Chemical Center, Edgewood, Md., told the American Chemical Society meeting in Chicago.

Existence of jellied or thickened gasoline was known during the war, particularly in the Pacific and especially to the Japs in dug-outs who learned the hard, flaming-hot way. But it was not told just how the scientists thickened the fuel

and made it so jelly-like that it stuck to things it was thrown against.

Aluminum soap thickeners consist of three kinds of chemicals: 1. an aluminum salt of the soap-forming saturated, fatty acids. 2. an unsaturated soap-forming fatty acid. 3. naphthenic acid. These are used separately or as a mixture. Napalm, one of the most successful of the incendiary gels, is an aluminum soap of an oleic, naphthenic and coconut fatty acid mixture.

These aluminum soaps have interesting and unusual properties that no other similar group of compounds possess. They become thick and viscous when

shaken. They make the gasoline "set" when mixed with it. Chemists call this property "thixotropic."

Under cloak of post-war secrecy, it is known that experiments are being pushed vigorously to make even thicker and more solid gasoline so that fuel can be stored and handled somewhat like a solid instead of a liquid. This present military research is probably based on the war-time successes, although it was not discussed at the meeting.

Dr. Rueggeberg did make known that natural and synthetic rubbers as well as plastic resins such as the polyacrylates can be used as fuel thickeners. These produce jellies that are somewhat different from the soap-thickened fuels.

Science News Letter, May 1, 1948

CHEMISTRY

Whisky of the Future Can Be Made from Wood

➤ WHISKY of the future can be made from wood, instead of being merely aged in the wood. Science is ready to substitute sawdust for grain in ethyl alcohol manufacture and save huge quantities of wheat, corn and other grain for feeding a hungry world. Only federal regulations prevent this from happening now.

Dr. Robert S. Aries of the Brooklyn Polytechnic Institute told the American Chemical Society meeting in Chicago that a \$3,000,000 alcohol plant already built could produce 10,000,000 gallons or enough to make over 25,000,000 gallons of whisky. A ton of sawdust now wasted can yield about 50 gallons of drinkable alcohol.

Natural gas and petroleum refinery wastes can also be made into alcohol as good as grain alcohol, Dr. Aries claimed. The cost of alcohol from wood waste is a third of that from grain and the synthetic alcohol from oil and gas costs even less.

The drinker might not be able to tell the difference, Dr. Aries said. Slogans such as "Made from wood, aged in the wood" might win public approval for the new kind of whisky.

If the regulations of the Treasury Department controlling liquor manufacture were changed, the labels on the bottles might read "sawdust neutral spirits" and "petroleum neutral spirits" where they now read "grain neutral spirits."

The more than 10,000,000 tons of sawdust wasted annually could supply more than three times the demand for whisky. Every ton turned into alcohol would replace 20 bushels of corn or wheat.

Science News Letter, May 1, 1948

MEDICINE

Cobalt for Cancer Tested

This radioactive material is being tested at four institutions to determine standard dose for treatment. Will be a cheap and plentiful substitute for radium.

➤ **TESTING** of radioactive cobalt from the atomic pile for treatment of cancer patients is now under way at four institutions.

This is the material which Chairman David E. Lilienthal of the Atomic Energy Committee told President Truman could become a cheap and plentiful substitute for costly radium now used in cancer treatment.

The four institutions where the new material is being tested are: Ohio State University, at Columbus, Ohio; Memorial Hospital in New York; the University of California at San Francisco and Washington University at St. Louis.

Cancer patients generally may not get radioactive cobalt treatment for some little time. This is not because of any production bottleneck. It is because the dose has to be standardized. This is a job for experts and is what is now being done. But it may take two or three years or even longer, A.E.C. officials said. They pointed out that it took 25 to 30 years for standardization of radium dosage.

The material will cost only about a tenth of what radium costs, it appears from comparison of present prices. A.E.C. list price for one unit of radioactive cobalt is \$33 f.o.b. Oak Ridge, Tenn. To this must be added a \$25 handling charge, made on all shipments of radioactive material from Oak Ridge, and the shipping charges on the unit in its 200-pound lead container. The total would probably come to between \$60 and \$75. The cost of an equivalent amount of radium, on a dosage basis, would be \$500. To this must be added insurance, which is very costly on radium, and handling and packing charges. Radium, because of the radon gas which emanates from it, involves a more difficult handling problem.

Smaller hospitals usually borrow or rent their radium from larger institutions, because it is so scarce and costly they cannot afford to own any. Some larger centers have theirs on loan from the National Cancer Institute of the U.S. Public Health Service.

Radioactive cobalt would be used in needles or tubes in the same way that radium is used for cancer treatment. It

cannot be used in a colloidal form, as radioactive gold is now being used, because it has too long a half life. Its half life is 5.3 years. An advantage of the colloidal form in which radioactive gold is being used is that not only gamma radiation but also beta radiation from

MEDICINE

New "Blue Baby" Disease

➤ **SANITATION** chemists were alerted to the hazard of a new "blue baby" disease that comes from nitrates in drinking water.

The disease may be confused with congenital heart disease, which also produces "blue babies," but it is not the same condition, James G. Weart, sanitary engineer of the Illinois Department of Public Health, explains in his report to the American Chemical Society meeting in Chicago.

Infant methemoglobinemia is the name of the blue baby disease that comes from too much nitrate in drinking water. The disease is apparently limited to babies under six months of age.

In Illinois alone 33 cases of the disease with five deaths have been reported in the past year. Cases are being reported with increasing frequency in Iowa, Kansas, Oklahoma, Texas, Nebraska, Missouri, Minnesota and Michigan as well as Canada and Belgium.

The disease may also exist in the richer agricultural areas of Europe and Asia, where soil and water conditions would favor its development. The role of water in causing the disease has only been known since 1945, so more cases may be reported as physicians become familiar with the symptoms.

Babies usually recover swiftly if a satisfactory water is substituted for the high-nitrate water in their formulas and drinking water. But in countless rural homes no other source of water is available and there is no practical way of removing the nitrate from the water. For this reason Illinois doctors have been advised not to prescribe feeding formulas involving water unless the nitrate content of the water is known to be within

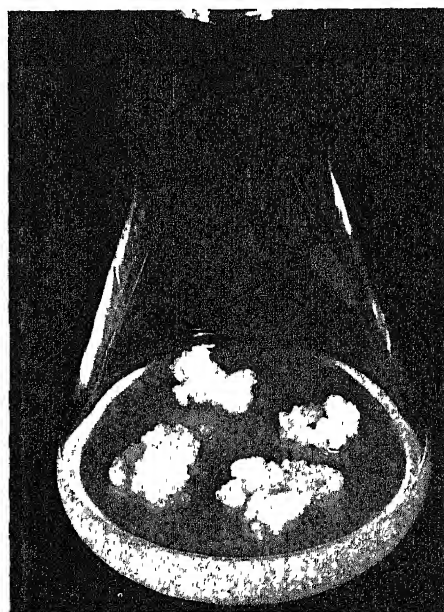
many billions of point sources are utilized to bombard the cancer.

Commenting on the development of radioactive cobalt for cancer treatment, Dr. Leonard Scheele, director of the National Cancer Institute until his appointment this month as Surgeon General of the U. S. Public Health Service, said:

"If radioactive cobalt proves to be an entirely effective substitute for radium in the treatment of cancer patients, and we have reason to believe this will be so, it will afford welcome relief to hospitals and medical centers throughout the country."

Science News Letter, May 1, 1948

safe limits. A maximum safe limit of 10 parts of nitrate nitrogen per million parts of water has been set.



PLANT TISSUES GROW IN CULTURE—Masses of undifferentiated plant tissue can be grown from just a few cells each, taken from tumorous growths on plants known as crown galls. Those shown here were produced from a crown gall of a periwinkle plant, supplied with a nutrient mixture of accurately known chemical composition, in the plant pathology laboratories of the University of Wisconsin, by Prof. A. J. Riker, Mrs. Alice Butsche and A. C. Hildebrandt. They were shown before the recent meeting in Madison of the American Association of Anatomists.

The poisonous effect of the high nitrate water results, Mr. Weart explained, from the conversion of the nitrate into nitrite by bacterial action in the intestine. When absorbed into the blood the nitrite changes part of the hemoglobin, the oxygen-carrying chemical that makes blood red, into methemoglobin. This is an inert chemical that does not transport oxygen to the tissues. The blood becomes chocolate colored and the skin turns slate gray. Although the baby's appearance is alarming, its breathing and circulation may be relatively normal. But if the acute cyanosis persists

general damage and death may occur.

Besides changing the drinking water, treatment of the baby with either a blue dye, methylene blue, or with vitamin C, is said to bring dramatically prompt recovery.

One reason only infants seem susceptible to the ailment is that they have much less functioning hemoglobin than adults. The effect on older babies and children of continuing to take large amounts of nitrates is not positively known, but it may deplete them of vitamin C. Lack of this vitamin results in scurvy.

Science News Letter, May 1, 1948

CHEMISTRY

New Food-Saving Varnish

► THE world's first completely synthetic varnish, made from petroleum, promises to add to the world's food supplies by replacing paints and varnishes now made from edible vegetable oils.

The new type varnish prepared from a new petroleum chemical, glycerol allyl ether, was announced to the American Chemical Society meeting in Chicago by chemists from the Shell Development Company, Emeryville, Calif.

Insoluble films, hard to hurt with chemicals and resistant to scratching, are formed by the new varnish. It is made in several chemical steps from propylene gas, which is abundantly available from cracking oil.

Manufacturers are expected to apply the new varnish where they now use resins made from a combination of synthetic materials and scarce natural drying oils.

Linseed oil, soybean oil and cottonseed oil, which can be used as food, have been used as major ingredients up to now of so-called synthetic paints and varnishes. The new varnish is one of several attempts to replace some of the scarce vegetable oils with synthetic products made from more available non-food materials, such as crude oil.

H. Dannenberg, T. F. Bradley and T. W. Evans were the Shell chemists who did the research.

Science News Letter, May 1, 1948

ENGINEERING

Need for Coal Stressed

► MORE coal from American mines will be needed and the amount will rapidly increase during the next decade, the American Mining Congress was told at its meeting in Cincinnati by Dr. John I. Yellott of the Locomotive Development Committee, Baltimore. The reasons, he stated, are a deficiency of fluid fuels, large coal exports, and the interchangeability from a chemical standpoint of coal, oil and gas.

The major increases in the nation's fuel requirements must be met in some manner from coal, he declared, because the fluid fuels are rapidly approaching the point where their use will be restricted to applications, particularly automotive, to which coal is inherently unsuited, and for which fluid fuels are virtually essential.

Industrial activities are increasing, and

new housing is needed for a growing population. These new demands can not be met by oil or gas, and they must be satisfied by and with coal. Industrial and institutional coal customers can be retained, however, only by improvement both in equipment and in coal quality.

A coal-burning gas-turbine locomotive, now designed after three years of experimental work, was described by Dr. Yellott as one of the improved methods of using coal with a high degree of efficiency. Very finely powdered coal, pulverized on the locomotive, is forced into the combustion chamber mixed with compressed air. It is burned in suspension within an air-cooled combustor, and the heated gases, with fly ash removed, will run the gas turbine, which in turn will drive electric generators. The coal-fired gas turbine will have

a wide field of use in stationary plants as well as in locomotives, he declared. The gas turbine is the first power plant which can exceed 25% in thermal efficiency without using a drop of water. An immediate application will be in supplying power for coal mines, which must now purchase power because they have no water for boilers and condensers. The gas turbine will free the power engineer from bondage to the boiler, and it will enable him to locate his power plant where he wants it, rather than near a water supply.

Science News Letter, May 1, 1948

One birth in 89 results in twins, one in 8,846 in triplets, and one in 599,921 gives America new quadruplets.

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ASTRONOMY

Eclipse Expedition Ready

Two months of testing equipment preceded the undertaking. Will offer rare opportunity to gather additional information on the shape of the earth.

By DR. LYMAN J. BRIGGS

Chairman, Committee on Research,
National Geographic Society

Written especially for Science Service

➤ SCIENTISTS awaiting the annular eclipse of the sun on May 8-9 are confident that, weather permitting, observations will go off as scheduled.

All equipment to be used by members of the multiple eclipse expedition, sponsored by the National Geographic Society, was put through its paces for two months before being shipped to observation points from Burma to the Aleutians.

Seven cameras to be used at various land stations along the eclipse path, together with radio and other equipment, were first carefully tested for many weeks by technicians at the National Bureau of Standards. Then the astronomers and geodesists responsible for their smooth operation at eclipse-time were brought to Washington for final tests.

Central Line of Eclipse

The central line of this solar eclipse starts in the Indian Ocean. Following the west coast of the Pacific Ocean, it extends as far as the Aleutian Islands.

The eclipse takes place at noon in the Sea of Japan, where the sun will almost be totally hidden. At that point the tip of the cone of the moon's shadow comes very close to the earth's surface. Calculations show it will come within five miles of the earth at longitude minus 132 degrees 47 minutes, and latitude plus 40 degrees 51 minutes.

There the annular phase will last only 0.1 second. Thus second and third contacts—when the moon first hides the sun completely and when the sun reappears as the moon moves on—will occur practically simultaneously.

East and west from the above location the annular phase becomes longer the farther away the station is from the noon-point. In Indo-China and the Aleutians the annular phase lasts for about half a minute.

Since there is no real total phase, the usual investigations carried on dur-

ing a total eclipse cannot be undertaken. But this eclipse does offer a rare opportunity to achieve what has recently been called an "astronomical triangulation linkage."

If the times of contact are observed with great accuracy from stations of known geographic coordinates, they may be used for a check on longitudes. Prof. I. Bonsdorff of Finland has developed this method, suggested earlier by the Polish astronomer Prof. T. Banachiewicz.

The rapidly changing crescent near totality, when the Bailey beads appear, is recorded on movie film simultaneously with time-signals. The sun's image, snapped 24 times each second, will be 11 millimeters in diameter.

Such determinations have the advantage of being independent of the local variations of the vertical which affect the positions obtained by the astronomical-geodetic method. They can be of great value in bridging large distances across inaccessible regions or bodies of

water, and thus connect geodetic nets which have been established independently in various countries.

The present eclipse-line passes over a whole series of triangulation systems: the British Indian system in Eastern Burma, the Siam net, the Chinese and Japanese systems and even the American-Canadian one through the Aleutian Islands.

In view of the possibility of obtaining additional information regarding the figure of the earth as a basis for more accurate maps, the National Geographic Society is undertaking an expedition in cooperation with government agencies. They include the U. S. Air Force, the Army Map Service, the Signal Corps, the Naval Observatory, the Hydrographic Office, the National Bureau of Standards, the Coast and Geodetic Survey, and the State Department.

Seven Parties in Field

Seven land parties are now in the field. Each consists of an astronomer or geodesist, a radio-technician, a camera technician and a surveyor, together with the necessary camp personnel generously provided by the Army.

E. A. Halbach, director of the Milwaukee Astronomical Society, is in charge of the group at Mergui, Burma. At Bangkok, Siam, Prof. Charles H. Smiley,



PREPARING FOR ECLIPSE—Moving picture camera (35 mm) equipped with long focus lens and coelostat for observing 1948 annular eclipse is shown at the National Bureau of Standards.

director of Brown University's Ladd Observatory, is in command. The Rev. Francis J. Heyden, S. J., director of Georgetown University Observatory, is responsible for the observations at Wu-K'ang, China.

Dr. George van Biesbroeck of Yerkes Observatory is in command at Tenan, Korea. Reibun Jima, Japan, is under the supervision of Dr. John O'Keefe of the U. S. Army Map Service. Lt. Comdr. George R. Shelton and C. A. Shelton, both of the Coast and Geodetic Survey, lead two parties in the Aleutians.

Weather conditions in the Aleutians

are not promising as the Islands average about one sunny day in ninety. Consequently the U. S. Air Force is supplementing the land observations by sending two airplanes to undertake observations above the clouds.

The positions of the airplanes will be determined from signals received from Shoran stations, the locations of which are precisely known. These signals will be accurately tied in with the successive exposures made in the long-focus moving picture cameras in the airplanes, and with a time scale provided by crystal clocks.

Science News Letter, May 1, 1948

PHYSICS-PHYSIOLOGY

Four Balls Measure Heat

➤ A NEW four-balls instrument that tells better than the thermometer how hot you really are in summer was announced at the meeting of the National Academy of Sciences in Washington.

The instrument was devised by Drs. James D. Hardy and Charles H. Richards of Cornell Medical College. Ball radiometer and the more dignified term, panradiometer, are the names they have given it.

The four balls of the instrument are tiny, hollow silver ones, about the size of shoe buttons. The diameter of each is slightly less than a quarter of an inch. One is highly polished, one is blackened, one is white and one has heat put into it to compare with the temperature shown by the thermometer.

The instrument does the job of telling how hot you are because it measures not only the heat from the sun that strikes you directly but also the heat reflected onto you from buildings, pavements, and the like. The measurements include the heat from sunlight and the heat from the invisible heat rays of the sun.

The heat reflected onto you from surrounding objects is what makes you so much hotter on a down-town city street than on a suburban lawn.

A man standing still in the direct sunlight in New York City in the sum-

mer absorbs as much heat from the sun and the buildings and pavement as he would develop if he walked down the street at a fast trot, the new instrument showed.

The reason why the sun does not feel as warm in winter as in summer is that buildings and other surrounding objects do not give off as much heat in winter as in summer. In winter, standing in the sunlight, your body cools off, or loses heat, at the rate of about 60 calories per hour. But if the sun goes behind a cloud or you move into the shade, you lose heat at the rate of about 200 calories.

In summer in the sunlight in a city you get hot from the total heat radiated onto you about three times as fast as you cool off by losing heat in the winter in the sunlight. Heat radiated on you in summer sunlight is at the rate of 100 calories.

The measurements actually made with the instrument take into account the surface area of the body, its weight, time in hours or minutes, and the reflecting power of the skin and clothing in different parts of the sun's spectrum.

The instrument, reported at the meeting for the first time, will probably have practical applications for the armed services. They may use it, for example, for protection for men on duty in the Arctic and Antarctic or in hot desert regions.

Science News Letter, May 1, 1948

PHYSIOLOGY

Examine Rage Mechanisms

➤ WHETHER or not you fly into a rage when someone steps on you or refuses to obey your orders apparently depends on several distinct mechanisms in your

brain which interact as a series of checks and balances.

That is the case for cats, at least, Drs. Philip Bard and Vernon B. Mount-

castle of Johns Hopkins Medical School reported at the meeting in Washington of the National Academy of Sciences.

By removing a certain part of the brain, the neocortex, these scientists were able to produce extremely placid cats who failed to show any sign of anger when subjected to rough handling or quite strongly unpleasant stimulation.

Cats deprived of the entire forebrain, however, tend to show rage on rather slight provocation. So evidently one or more parts of the forebrain besides the neocortex continuously exert a suppressing effect on mechanisms in the lower part of the brain. It is these mechanisms which are "executively involved" in the bodily expression of anger. That is, it is these mechanisms in lower parts of the brain that make an angry cat spit or, perhaps, make the boss pound the desk when things go wrong.

Placid cats could be changed to ferocious ones by removal on both sides of the brain of either the cortex of the midline or certain parts of the so-called olfactory brain. But of a variety of operations in which more restricted parts of the forebrain on both sides were removed, the only one which caused "a gentle normal cat to become savage" was removal of amygdala and pyriform lobes. These two brain structures, one almond-shaped and one pear-shaped, are parts of the so-called olfactory brain.

Science News Letter, May 1, 1948

GENERAL SCIENCE

Condon Attack Jeopardized U. S. Scientific Program

➤ WHEN the Thomas Un-American Activities Sub-Committee of the House attacked Dr. E. U. Condon, Bureau of Standards director, it jeopardized the effectiveness of the entire scientific research program of the government, the American Association for the Advancement of Science's Executive Committee declared.

Protesting against the House sub-committee giving wide publicity to charges against Dr. Condon without holding any hearing, the committee composed of 11 U. S. science leaders, warned that "the continuation of American scientific achievement for the purposes of both peace and war depends upon the freedom and peace of mind of our scientists."

While scientists have no right to ask special privileges, the resolution states, the rights of every citizen under the Constitution and Bill of Rights should protect them against such treatment as accorded Dr. Condon.

Science News Letter, May 1, 1948

ASTRONOMY

Golden Age of Astronomy

Dawn of this new period is indicated by five new developments in sky study, among which are the 200-inch telescope, radioastronomy and coronagraphs.

➤ A NEW golden age of astronomy is dawning, due to five new developments in sky study.

Dr. Harlow Shapley of Harvard College Observatory, Cambridge, Mass., lists the new astronomical tools as:

1. The 200-inch telescope on Palomar Mountain, which will reach eight times the volume of space now known.

2. Radioastronomy, exploration by radar and other high-frequency waves, which will capture new facts about the earth's atmosphere and regions near the earth.

3. Small but wide-angled photographic telescopes of the Schmidt type that cover large areas of sky.

4. Light-sensitive cells that record variations in light more accurately than is possible with the human eye and extend the "vision" of astronomers into the region of the invisible "heat-light" of faint stars, planets and sun.

5. Coronagraphs that let astronomers see the sun's outer atmosphere or corona every clear day by producing a man-made total eclipse of the sun.

The 200-inch telescope on Palomar Mountain, scheduled to go into operation early this summer, will penetrate twice as far into space as has been possible previously. Pinpointing its sights on distant bits of light, it will bring within our reach a sample of the universe eight times as great as that now available.

Radioastronomy is a new branch of astronomy only recently announced, Dr. Shapley stated. By use of high-frequency radio waves meteors are tracked in their flight across the heavens through clouds and even in full sunlight. The ever-changing ionized layers of our atmosphere—the earth's invisible radio roof—are also explored by radio waves of short wavelength.

The trick of bouncing radio waves off the moon has also given us a tool with which to explore space between here and the moon. Microwaves from the sun enable astronomers to explore the areas around sunspots for sources of electromagnetic waves. Cosmic static furnishes us with another method for identifying a region in the constellation of Sagittarius, the archer, as the center of the

Milky Way system of which the earth is a part.

The Schmidt camera, the Super-Schmidt for studying meteors, and the Baker-Schmidt, a two-mirror combination still in the blueprint stage, all cover large areas of the heavens. Schmidt-type cameras are especially good for survey work, particularly for studying the Milky Way, Dr. Shapley reported.

For accurately detecting the light of distant stars, photocells are stable, dependable and accurate. Application of the new lead sulfide cell to astronomy has extended the usable red end of the spectrum of the sun, planets and brighter stars.

New instrumentation for solar research points to a new epoch in analyzing the surface of the sun, Dr. Shapley said. The coronagraph enables us to study the sun's outer atmosphere without having to wait for those infrequent total solar eclipses. Monochromatic filters developed for the coronagraph isolate tiny sections of light from the sun's disk so that activity of hydrogen and calcium gases 93,000,000 miles away can be detected.

V-2 rockets, by furnishing us with a means of getting above the ozone that blocks out the sun's ultraviolet rays, can help discover some of the secrets of our nearest star—the sun.

Science News Letter, May 1, 1948

AGRICULTURE

Infra-Red Radiator Now Protects Fruit Orchards

➤ THE infra-red radiation that enabled soldiers to see enemies in the dark by use of the snooperscope is now ready to combat frost in fruit orchards. Oil-burning infra-red generators, developed by the Michigan State College, may find wide use.

The radiator used is one of its most interesting features. It has five horizontally placed reflectors that focus the rays at a distance of about 80 feet from the unit. Scattering of rays causes them to cover an area of more than an acre.

The combustion chamber is placed at the base of the stand on which the re-

flectors are held. Kerosene or fuel oil is used. The unit consists of small diaphragm-type pump, driven by a one-twentieth horsepower, six-volt, direct current motor. Fuel is in a nearby tank. The pump will supply the fuel for a steady flame for over 20 hours off one charge of a 120-ampere hour, six-volt auto-type storage battery.

The pump used is also a development of the college engineering department. The pump and burner may have other uses.

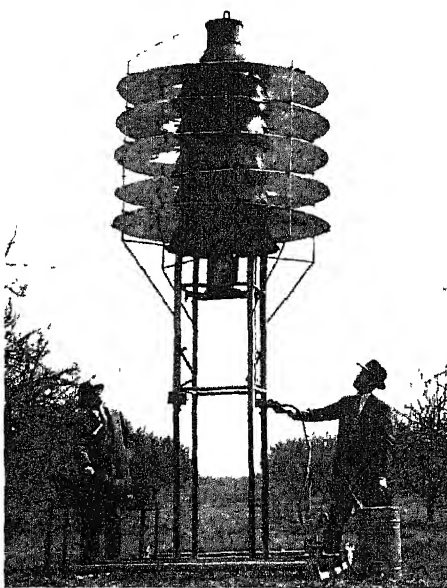
Science News Letter, May 1, 1948

PHYSIOLOGY

Thin Scalps Grow Bald Sooner than Thick Ones

➤ IT may be unjust to tell a middle-aged man who still has a bushy head of hair that he's a fathead; but Dr. M. Wharton Young of Howard University did say before the American Association of Anatomists, meeting in Madison, Wis., that thin scalps tend to grow bald sooner than thick ones, and that one aid to having a deep bed for your hair roots to grow in is to have a layer of fat under the skin. Main thing in keeping your hair is a rich supply of blood vessels, and these become scanty in thin scalps.

Science News Letter, May 1, 1948



RAY'S GUARD ORCHARDS — Michigan State College scientists have installed the infra-red radiator in orchards for experiments with the new frost-fighting apparatus. The picture shows the most efficient type yet developed.

CHEMISTRY

Light-Absorbing Pigments Give Off Vivid Colors

➤ YOU'LL be painting your house with "invisible sunlight" thanks to pigments that soak up light you can't see and give off vivid color.

Chemical research reported to the American Chemical Society meeting in Chicago by Dr. C. E. Barnett of the New Jersey Zinc Co., Palmerton, Pa., has increased tenfold the luminescent qualities of paint pigments.

During the war major improvements were made in materials that glow in the dark, and now the fact that some of these have "daylight fluorescence" is being applied to signs, soap and paint.

Ultraviolet light is absorbed on striking the materials and then emitted as visible color. The addition of this color to the normal reflection gives a more brilliant hue than can be obtained by reflection alone.

Science News Letter, May 1, 1948

CHEMISTRY

Sugar Can Be Made from Treated Oak Wood Waste

➤ HERE are some of the newest achievements of chemistry, reported to the American Chemical Society meeting in Chicago:

Sugar made from waste oak wood.

Sweeter molasses plus a sugar-cane by-product for soap production.

A new softener for some types of plastic from sour milk.

Cheaper alcohol for auto fuel.

Sugar can be made from oak wood waste, Dr. Elwin E. Harris of the Forest Products Laboratory, Madison, Wis., told the chemists. By treating it with a little sulfuric acid under steam pressure, it can be made to yield 45% sugar.

Sugar cane can be made to produce a by-product of use in synthetic soap making and the molasses will be sweeter as the result. R. J. Furse and Leon Godchaux II of New Orleans told of success in extracting the aconitic acid, which is also a softening agent for plastics and rubber.

Lactic acid, the tang of sour milk, can now change waste farm products into softeners for vinyl plastics products, a chemical team from the U. S. Department of Agriculture's Eastern Regional Research Laboratory, Philadelphia, reported. Dr. C. E. Rehberg, Marion B. Dixon and Philip E. Meiss explained that the agricultural products otherwise wasted would replace chemicals made

from oil, now in short supply.

A step toward cheaper use of alcohol for automobile fuel was reported by Dr. Donald F. Othmer of Brooklyn Polytechnic Institute, who told the chemists that the use of a new distillation process makes it just as cheap to produce absolute alcohol, 100% free from water, as the ordinary industrial alcohol which contains 5% water, interfering with its use as fuel.

Science News Letter, May 1, 1948

ENTOMOLOGY

Pin-Point Bombing Technic Developed to Kill Insects

➤ A PIN-POINT bombing technic, developed from Chemical Corps war research on poison gases, can now be applied to DDT destruction of disease-carrying mosquitoes and flies, Prof. Victor K. LaMer of Columbia University and Dr. Seymore Hochberg of Du Pont announced at the meeting in Chicago of the American Chemical Society.

The new technic involves use of an aerosol, or fine fog, of DDT solution. But the aerosol is made so that each droplet of DDT is exactly the right size to hit the body of mosquito or fly. Each droplet contains enough DDT to kill a single insect.

Larger droplets, like spray droplets, the scientists pointed out, fail to kill the insects because the droplets fall to the ground too quickly. Smaller ones are caught in the tiny air currents around each mosquito and flow around the insect without depositing on it. The mosquito is protected against these droplets by its streamlined body.

The ideal droplet size was found to be about 10 microns (four ten-thousandths of an inch) in diameter. It is achieved by a new generator invented by Prof. LaMer and Dr. Hochberg. Superheated steam catches and disperses droplets of oil-containing insecticide by passing the mixture through a tiny opening. Smoke screen generators in use before the war produced droplets which were too small and which also destroyed the DDT with heat.

Under favorable conditions, all mosquito life has been destroyed for more than a mile downwind from the fog generator with an outlay of only one pound of insecticide for every five acres of open country, the scientists reported.

By employing aerosols, or fine fogs, it is possible to kill mosquitoes and black flies, which are extremely susceptible to DDT, while birds, fish, bees, and other forms of animal life are left unharmed.

Science News Letter, May 1, 1948

IN SCIENCE

CHEMISTRY—NUTRITION

New Preservation Methods May Destroy Vitamins

➤ NEW methods of preserving food by bombarding it with X-rays, radar waves and electrons may destroy vitamins, necessary to high-quality diets, Prof. Bernard E. Proctor and Samuel A. Goldblith, of the Massachusetts Institute of Technology food technology laboratories, warned chemists at the American Chemical Society meeting in Chicago.

X-rays and electrons (cathode rays) destroy the organisms that cause spoilage in foods, without heating the food appreciably. But niacin, the anti-pellagra factor of the B-complex vitamins, is destroyed partially by X-rays and electrons.

The new electronic methods of preserving food are very promising because the food's natural flavor is retained.

Science News Letter, May 1, 1948

CHEMISTRY

Tastier Food Is Promise For Heart Patients

➤ THE food of heart disease patients won't have to lose its savor because a Brooklyn scientist has applied to water in the human body the same chemical trick that was used to desalt sea-water.

Dr. I. J. Greenblatt of Beth-El Hospital, Brooklyn, while serving in the Pacific area realized that the principle of the ion-exchange desalting emergency kits of planes and lifeboats could be applied to heart cases characterized by dropsy and swelling of the joints.

He and M. E. Gilwood of the Permutit Co., New York, told the American Chemical Society meeting in Chicago that three tablespoons of a synthetic plastic swallowed after and before meals seem to allow such cardiac cases to eat a more normal diet.

Saltless, tasteless diets largely of rice and starch have had to be the food of such heart cases. With doses of the new plastic, more normal food can be eaten as the material removes salt within the intestinal tract before it can get into the blood stream.

The ion exchange material used is a synthetic resin ground into tasteless powder grains coated with fatty chemicals and shellac.

Science News Letter, May 1, 1948

E FIELDS

VETERINARY MEDICINE

Worms May Clear Mystery Of How Diseases Spread

➤ THE mystery of how some diseases spread may be cleared through a lead reported at the meeting of the American Philosophical Society in Philadelphia.

Worms, Dr. Richard E. Shope of the Rockefeller Institute for Medical Research reported, spread the germs of at least three animal diseases.

The diseases are blackhead of turkey, salmon poisoning of dogs and influenza of swine.

Swine influenza is caused by the concerted activity of a bacterium and the swine influenza virus. The virus has as its intermediate host the common swine lung-worm.

It is believed, Dr. Shope said, that the three diseases now known to be spread by worms represent only a portion of a larger group. Further investigation should be made of worms as possible germ-carriers in diseases whose manner of spread is still not completely understood.

Science News Letter, May 1, 1948

MEDICINE

Radioactive Porphyrins Suggested as Cancer Aid

➤ A NEW method for cancer detection, that may also prove useful in cancer treatment, was described before the meeting of the American Association of Anatomists in Madison, Wis., by Dr. Frank H. J. Figge and Dr. Glenn S. Weiland of the University of Maryland school of medicine. Thus far, they have cautiously used it only on cancerous mice; but the principle seems capable of general application, and possibilities of its eventual extension to take in the field of human cancers is being investigated.

The compounds used by the Maryland researchers belong to the rather complex organic group known as the porphyrins. Porphyrins themselves are cancer-provokers, and they have an affinity for rapidly growing tissues anywhere. They tend to concentrate in such things as developing embryos and healing wounds, where their presence can be demonstrated through their red fluorescence

under ultraviolet light. Drs. Figge and Weiland injected porphyrins into cancerous mice, and later found the animals' tumors to be redly fluorescent.

With this demonstration of porphyrin concentration in cancers in hand, they now suggest the desirability of hitching radioactive metal atoms, like those of sodium, onto the porphyrin molecules. Increased radioactivity of any given part of the body would then be legitimate grounds for suspecting cancer; and possibly the radioactivity of the tracer element would in itself prove a helpful treatment of the condition.

Science News Letter, May 1, 1948

SEISMOLOGY

Man-Made Quake Waves Studied After Explosions

➤ SMALL, man-made earthquake waves have been recorded nearly 200 miles away from an explosion with sensitive new instruments developed by Carnegie Institution of Washington scientists.

The instruments are small, portable versions of the seismographs which register earthquakes. But the shocks are from the blast of hundreds of pounds of high explosives set off on the bottom of the Patuxent River near Washington.

Scientists conducting the experiments include Drs. M. A. Tuve, R. W. Goranson and J. W. Greig, and W. J. Rooney, J. B. Doak and J. L. England.

Explosions on the bottom of the Patuxent river have been set off at intervals for more than a year. Seconds after a blast, waves through the earth are recorded on the scientists' instruments at points at varying distances and directions from the explosion.

This new information is helping the Carnegie Institution scientists plot a unique map. It will show what the earth is like down to 30 miles under the nation's capital and nearby states.

In addition to the explosions in the Patuxent river, blasting in quarries in Maryland, Virginia, Pennsylvania and New Jersey have been recorded.

Thus far, Somerset, Pa., is the farthest point from the river explosions where the new instruments have detected the seismic waves, but the scientists believe that they can be used up to 250 miles.

Natural earthquakes have given science many clues about the earth below the surface, but tremors are too unpredictable for the systematic study of a region. Now, the Carnegie scientists are creating their own seismic waves for the new experiments.

Science News Letter, May 1, 1948

GENERAL SCIENCE

Revised Foundation Bill Approved by Committee

➤ A REVISED bill to establish a National Science Foundation has been approved by the Senate's Committee on Labor and Public Welfare.

The bill, which supporters of the proposed Foundation hope will be voted on by the Senate soon, now gives fewer powers to the nine-man executive committee than were listed in the original bill. Several of the functions and powers of the executive committee have been given to the full Foundation membership of 24.

Taken out of the bill by the Senate committee were specific provisions for special commissions on cancer, on heart and intravascular diseases and on poliomyelitis and other degenerative diseases. It is now stated simply that the Foundation may establish such special commissions as it deems necessary.

The bill was introduced in the Senate by a bipartisan group of Senators, while an identical measure is being sponsored in the House of Representatives by Rep. Charles A. Wolverton, R., N. J. The House bill has not yet been reported out of the Committee on Interstate and Foreign Commerce, of which Rep. Wolverton is chairman.

Science News Letter, May 1, 1948

CHEMISTRY

Wrinkle-Proof Cottons Soon To Be Available

➤ ALL types of cotton will soon be available that withstand summer wear without wrinkling because treated with a new finish which also controls shrinkage to a low limit. The finish will be known as Superset, and is a product of the American Cyanamid Company.

Wrinkle-resistant finishes have been widely used for rayon fabrics but up until now only heavy cotton could be treated with them because they seriously weaken the fabric. The new material causes little or no loss of tensile strength. The finish is effective after many severe test washings.

Melamine resin forms the basis of the new preparation. It has been modified in such a way that it does not affect the strength of the fabric. It is applied in the mills, and has been successfully tested in use with gingham, dress goods, prints, denims, corduroys, seersuckers and other types of cotton garment material.

Science News Letter, May 1, 1948

ASTRONOMY

Five Planets Now Visible

Brightest of these is Venus which appears long before any other star or planet. Annular eclipse of the sun is expected this month.

By JAMES STOKLEY

➤ ALL of the five planets that are ever visible to the naked eye—Mercury, Venus, Mars, Jupiter and Saturn—can be seen on evenings of May, though not simultaneously. Brightest of the quintet is Venus, which stands high in the west in the constellation of Gemini, the twins, at sunset. On May 18 it reaches greatest brilliance, magnitude minus 4.2 in the astronomical scale, about 120 times as bright as an average star of the first magnitude. Because of its splendor it appears long before any other star or planet, so there is little difficulty in locating it.

The position of Venus, nevertheless, is shown on the accompanying maps. These depict the sky as it appears at 11:00 p.m., your local kind of daylight saving time on May 1, an hour earlier in the middle of the month and two hours earlier at the end. By May 31, however, sunset is so late that it is not yet dark at 9:00 p.m. (8:00 p.m. standard time).

Toward the southwest, in the constellation of Leo, the lion, and Cancer, the crab, appear two more planets. Mars, red in color, is close to the star Regulus and passes about a degree north of it on May 15. It is now of magnitude 1, slightly brighter than the star. A few degrees to the west of Mars, just across the border in the next-door group of Cancer, is Saturn, of magnitude 0.6, which makes it about half again as bright as Mars.

Jupiter Second in Brightness

A planet that is second in brightness only to Venus (which exceeds it about seven times) appears in the east about an hour later than the times for which the maps are drawn. This is Jupiter, in Sagittarius, the archer, the group next to Scorpius, which is partly visible on the maps at the southeastern horizon.

Last of our planets is Mercury, which moves in the orbit nearest the sun. Thus it never remains visible long after sunset, but on May 28 it is in the best position of the year. It will then be in Taurus, the bull, just below Gemini, and its magnitude will be minus 0.7. As the

sun goes down, it will be about 18 degrees above the horizon (it is 90 degrees to the zenith) and soon after that it may be glimpsed in the gathering dusk. By the time the sky is completely dark it will be gone from view.

Vega, in the constellation of Lyra, the lyre, in the northeast, is the brightest star visible these May evenings. Second is Capella, in Auriga, the charioteer, toward the northwest. High in the south, marking the figure of Bootes, the bear-driver, is Arcturus, third in our list. Below this group stands Virgo, the virgin, with Spica, another star of the first magnitude. Next to the right-hand end of that area we see Leo, the lion, with the star Regulus and the planet Mars, already noted.

Gemini Is Brightest Star

The brightest star in Gemini, where we see Venus, is Pollux. The star Castor, which marks the other twin, is second magnitude. Procyon, in Canis Minor, the lesser dog, seen low toward the west, is another of the first magnitude, as is Antares, in Scorpius. This, however, is so low in the sky, that its brightness is greatly dimmed.

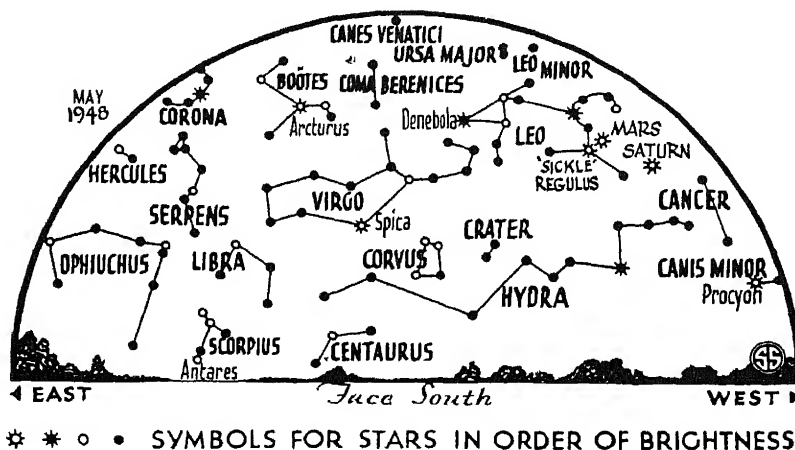
Like the same month a year ago, May brings an eclipse of the sun, but there are important differences. That of May 20, 1947, was total. Because the sun is so much larger than the moon—864,000 miles as compared with 2,160—the

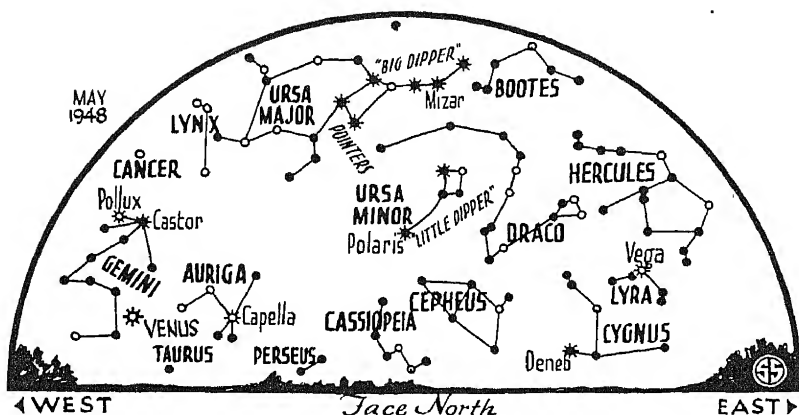
shadow of the moon is conical. It tapers to a point at an average distance of 232,100 miles from the moon's center. As the actual distance between sun and moon changes, its length is altered also. Thus it can be as short as 228,200 miles or as long as 236,000 miles. The distance between moon and earth varies from 221,463 to 252,710 miles. Therefore the shadow does not always reach as far as the earth. It did last May, when the tip of its shadow swept across South America and Africa, and persons along that path saw a total solar eclipse with the sun completely hidden by the moon.

Annular Eclipse of Sun

Every time the moon is new it is nearly between sun and earth. On most such occasions, the lunar shadow passes either south or north of our planet and there is no eclipse, such as occurred in May, 1947. This year, on May 8, the moon is new, and again it is in line with sun and earth, only this time the shadow does not quite reach us. The result is an "annular," rather than a total, eclipse. Even along the path on the earth traced out by the direction of the shadow the sun is not completely covered. A ring of solar surface, called the annulus, remains visible around the lunar disk.

The path along which this occurs starts in the Indian Ocean, crosses Siam, China, the Sea of Japan, Japan, the Sea of Okhotsk, the Kurile Islands, the Pacific Ocean and the Aleutian Islands. At a point in the Sea of Japan, according to calculations, the tip of the shadow will be only five miles above the ocean. Since





the computations are subject to this much uncertainty, it may be that from this position there will just barely be a total eclipse, with the sun's disk completely covered, but if so, it will be very brief.

A total eclipse permits complete observation of the sun's outermost layer, the corona, as well as other effects visible only at such a time. The remaining ring of sunlight prevents these at an annular eclipse, so ordinarily astronomers pay little attention to them. This time, however, the National Geographic Society, in collaboration with the State Department, the Coast and Geodetic Survey, the National Bureau of Standards, the Army, Navy and Air Force, will make observations from a number of locations along the path. Their aim will not be more knowledge of the sun, but of the earth. If the observations are successful, and made with sufficient precision, their analysis will yield the most accurate determination ever made of the size and shape of our globe. These should permit relative positions on the earth to be pinpointed within 150 feet or less. Now, in some cases, the precision of determination of a place may be in error by as much as several hundred feet up to a mile. In case of a war using long range missiles guided by automatic means, this increased precision might mean the difference between a hit and a miss on a vital target.

A rather curious feature of this eclipse, which is true of any that starts in the eastern hemisphere and ends in the western, is that it ends the day before it starts! The beginning of the 5,320-mile path is west of the International Date Line, at 180 degrees longitude, where it is already Sunday, May 9. But on the eastern side of the line it is still Saturday, May 8. By Eastern Daylight Saving Time, the eclipse will begin, at the western end of its path, at 8:45 p.m., and will reach the eastern end at 12:06

a.m. Over most of Asia, the northern part of the Pacific Ocean, Alaska and northwestern Canada, a partial eclipse will be seen, but nothing of this will be visible from the United States.

Time Table for May

May	EST	
1	8:00 p. m.	Moon farthest, distance 251,-200 miles
4	early a. m.	Meteors coming from direction of constellation of Aquarius
8	9:30 p. m.	New moon—annular eclipse of sun
12	4:33 a. m.	Moon passes Venus
15	3:14 a. m.	Moon passes Saturn
	11:00 a. m.	Moon nearest, distance 229,-800 miles
16	7:55 p. m.	Moon in first quarter
18	12:15 a. m.	Moon passes Mars
22	4:00 a. m.	Venus at greatest brilliance.
24	7:27 p. m.	Full moon
28	5:57 p. m.	Moon passes Jupiter
29	3:00 p. m.	Mercury farthest east of sun, visible for a few days around this date shortly after sunset
30	5:43 p. m.	Moon farthest, distance 251,-200 miles
		Moon in last quarter

Subtract one hour for CST, two hours for MST, and three for PST.

Add one hour for the corresponding Daylight Saving Time.

Science News Letter, May 1, 1948

ATOMIC ENERGY

Uranium Is too Scarce for Use as Source of Fuel

➤ THE atomic bomb element, uranium, is so scarce it should not be used as a major source of fuel or power, a famous physicist warned.

Dr. Robert Andrews Millikan, Nobel prize winner in physics and retired head of the California Institute of Technology, declared that the world's supply of uranium is "easily exhausted."

He discussed atomic energy as a guest of Watson Davis, director of Science Service, on Adventures in Science, heard over the Columbia network.

Uranium, he pointed out, is only six parts in a million in the earth's crust. It is "not quite as rare as gold, but it is exceedingly rare."

Even with other heavy elements as

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Do You Know?

Color is the chief factor in grading maple sirup for quality.

Most mammals, except man and certain primates, seem to be *color-blind*.

Germans are reported to have used *electronic heating* during the war in lumber drying, wood gluing, cigarette curing, plastics heating, lice killing, and food processing.

Jackrabbits have played a large part in scattering juniper trees, often called cedar, on prairie grasslands in Texas and Oklahoma; the rabbits eat the berries of the tree but do not crack the seeds and they pass through the digestive tract uninjured.

Teamsters of earlier years are said to be responsible for the American custom of passing on the right; they rode the left rear horses of their four-to eight-horse teams so that their right, or whip, hand would be free to reach all animals, and passed on the right to see clearance with other wagons.

COMPACT

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possible sources of atomic energy, Dr. Millikan said, the world's atomic resources are limited.

"They are easily exhausted and therefore they will be increasingly costly," he cautioned.

The scientist declared that the suggested use of the lightest element, hydrogen, for the release of atomic energy, a process which is believed to take place on the sun, "is forever unattainable on earth."

Only four important deposits of uranium are known, Dr. Millikan reported. These are in Belgian Congo, Czechoslovakia, Canada's Big Bear Lake and the carnotite ores of southwestern Colorado and southeastern Utah. Most important are the ones in Belgian Congo and Canada.

New sources of the atomic bomb element may be found, but "uranium will continue to be a very scarce element," he

predicted. Calling for conservation of atomic resources, he asserted uranium "should not be used for any major fuel or power purpose."

Without using uranium, Dr. Millikan said, we already have unlimited sources of atomic energy. Gas, oil and coal, "three forms of bottled sunlight," are really a form of atomic energy, he explained.

The atomic process in the sun that gives us these standard forms of fuel is due to "atom-building," instead of "atom-disintegrating," which is used in the atomic bomb, the scientist added.

"The greatest service to mankind of the atomic bomb and atomic energy," Dr. Millikan suggested, "would be to make clear as crystal to all classes and conditions of men the world over the necessity for eliminating aggressive war."

Science News Letter, May 1, 1948

ZOOLOGY

Cancer Cells Transformed

➤ TRANSFORMATION of cancer cells to normal cells was reported by Drs. S. Meryl Rose and Hope M. Wallingford of Smith College at the meeting of the National Academy of Sciences in Washington.

The transformation was accomplished by transplanting a cancer from a frog into the limb of a salamander and, after the cancer graft had taken, cutting off the limb through the cancer.

In all cases the salamander grew a new limb in the normal way. Within the new, regenerated salamander limb were patches of normal frog muscle, cartilage and fibrous connective tissue. These had grown, or regenerated, from the transplanted frog cancer. Most of them were next to unchanged cancer cells which remained in the old part of the salamander limb above the line of amputation.

Normal tissues in regenerating limbs, the scientists pointed out, go back to the embryonic state in which the cells are undifferentiated. Then, as the cells grow they differentiate into new tissues, just as the embryo cells differentiate into muscles, bones, nerves, and glands.

Because cancerous tissue seems to be abnormally differentiated, the scientists tried to see whether it could be forced back to the embryonic state of no differentiation from which it would be transformed into normal tissue as the cells regenerated.

Frog cancers were transplanted into

salamander limbs so that the former cancer cells could be recognized if they did go back to normal. The frog cancer cells have small nuclei, whereas salamander limb cells have much larger nuclei. The difference in size of cell nucleus made it possible for the scientists to tell which cells in the new salamander limb were salamander cells and which were originally frog cancer cells transformed to normal.

Science News Letter, May 1, 1948

GEODESY

Parachuted Flares Aid In Charting Locations

➤ RADIO-timed flares dropped on parachutes from high-flying planes, instead of lights on top of high skeleton towers, are the newest technique for enabling geodetic surveyors to pin-point locations on charts with great accuracy. The method was described before the meeting of the American Geophysical Union in Washington by Lt. Comdr. F. R. Gossett of the U. S. Coast and Geodetic Survey.

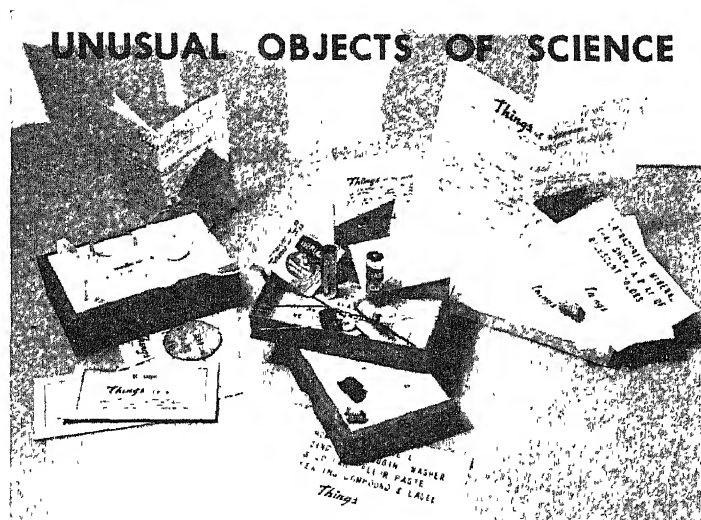
A tryout tying in the coasts of Florida and the Bahamas has given assurance that results are valid if conditions are right. The weather has to be perfect, so that six flares dropped simultaneously, three over accurately known locations and three from undetermined spots, can be seen at the same time. Possible ranges run up to 200 miles.

Science News Letter, May 1, 1948

Sale . . .

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we will send you, postpaid, units of THINGS of science described below. Each unit has, in addition to science objects, its own leaflet of description with many experiments suggested. Museum-style legend cards are provided with each exhibit.



1 LIGHT COLLECTION

A mineral that makes you see double; a small lens that enlarges letters and objects; materials with which to assemble a dry-cell—these are the exciting objects contained in the MINERAL OPTICS, GLASS LENS AND DRY CELL UNITS making up this collection. In the picture (upper left) you see ten GLASS LENS UNIT specimens, including a square glass blank for molding a lens, molded blank, partially polished blank, finished lens and envelopes of emery and rouge with which you yourself can grind glass. A red filter, magnifier, mirror and photographic lens part are also included. The upper right group includes Iceland spar, phlogopite and labradorite, all part of the MINERAL OPTICS UNIT. A factory-assembled dry cell and the materials needed to make one at home—zinc can, wrapped bobbin, bottom washer, top collar, sealing compound and label—are shown at center as included in the DRY CELL UNIT. Also included are a tiny flashlight bulb, litmus paper, cardboard washers, tinned copper wire, insulated copper wire, iron rod and iron filings with which you can perform experiments in electricity.

2 COLOR COLLECTION

Paints that glow in the dark; red and green plastic sheets that together cut out all light; brilliant dyes obtained from plant roots—these and many other intriguing specimens are contained in the PHOSPHORESCENCE, PLASTIC PILOT AIDS and VEGETABLE DYES UNITS which make this colorful collection. There are fourteen specimens in all, including blind flying sheeting in red and green, dimout blue sheeting, ultra violet transmitting sheeting, phosphorescence plastic, tape, pigment, paint, madder, indigo, tumeric and alum.

4 MINERAL COLLECTION

Stones showing the original structure of trees that grew millions of years ago; vacuum tube insulator made from one of the softest known minerals; rock containing traces of native sulfur—these are the surprising subjects in the PETRIFIED WOOD, TALC and SULFUR UNITS making up this collection. In the three boxes there are seventeen specimens, including petrified sweetgum, redwood, oak, elm and bog, fired and natural talc, sulfur-bearing limestone, iron sulfide, zinc sulfide, crude sulfur and flowers of sulfur.

6 TASTE COLLECTION

Raw chicle from which chewing gum is made; unopened flower buds used as spices; an edible wetting agent—these are only a few of the exciting specimens contained in the CHICLE, SPICE and LECITHIN UNITS that form this unique scientific group. There are twenty-two specimens in the collection, including raw chicle, finished chewing-gum base, powdered sucrose, dextrose, corn syrup, oil of peppermint, candy-coated gum, allspice, caraway, celery, cinnamon, cloves, ginger, sage, soybean flakes, pure lecithin used chiefly for medicinal purposes and lecithinated flour.

8 UNUSUAL MATERIALS COLLECTION

Porous cushioning material for upholstery; glass-enclosed air cells used to keep out heat or cold; zinc made fine-grained by incorporation of only 0.05% lithium—these materials of industrial importance are contained in the HOUSING, HOME AND OFFICE and LITHIUM UNITS. The eighteen specimens contained in these three blue boxes include wood-fiber wallboard, plywood, glass fiber fabric, coffee measure, airfoam, plastic and wire screening, shaver head, natural spodumene, lithium chloride, lithium nitride, pure zinc, zinc and lithium master alloy, and lithium-treated zinc.

3 FIBER COLLECTION

Synthetic fiber made from skim milk; twisted rayon cord used in auto tires; glass fibers less than three ten-thousandths of an inch in diameter—these are the interesting subjects of the CASEIN, RAYON and GLASS FIBER UNITS that will be sent to those selecting this collection. In the three boxes that make up this series of exhibits there are fifteen specimens, including casein powder, raw fiber spun from casein, aralac, soft glass fiber, cotton linters, chemical cotton pulp, rayon tire cord and rayon fabric lining material.

5 PLASTIC COLLECTION

Film with a seam that is stronger than the plastic itself; plastic plate with which you can print a bit of illustration or writing; plastic-coated yarn for crocheting or braiding a design—these are the rewarding specimens contained in VINYL RESIN FILM, PLASTICS IN PRINTING and PLASTIC COATED YARN UNITS which comprise this unusual scientific collection. There are 20 specimens, including vinyl plastic film, heat sealed seam, spot welded ruffle, plastic printing plate, moisture-proof sheeting, twist leaflet binding, plastic-coated yarn, flame-retardant webbing and fine fabric.

7 TEXTILE COLLECTION

Raw material from which you can make a length of synthetic fiber; complete ball of fluffy white cotton; dye that enables you to identify different types of textiles—you have examples of both natural and synthetic fibers and a means of identifying them in the VINYL RESIN FIBER, COTTON and TEXTILE IDENTIFICATION UNITS. Twenty-two specimens make up this varied display, including vinyl resin, unstretched vinyl resin yarn, filter cloth, sailcloth, waterproof felt, tea bag, cotton boll, cotton that is tinted brown and green by nature, a differential dye and several swatches of different types of fabric to show how to distinguish cotton from silk, rayon and wool.

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A Worsening World

➤ **ATOMIC WAR** is not the most serious threat to the continued existence of the human race today; man is threatened with self-destruction through reckless misuse of the land that destroys his very means of subsistence, declares Dr. Fairfield Osborn, president of the New York Zoological Society. In a new book, *Our Plundered Planet*, published by Little, Brown and Company (\$2.50), he traces the consequences of man's need and greed through the centuries, and points out the fate that will be inevitable if our present land-ruining practices are permitted to persist.

Despite the pressure of hungry millions on food resources, greed seems to have played a larger part than need in wasting the soil. Deforesting upper mountain slopes, plowing good pasture into bad fields, overloading the range with too many sheep (and worse still, goats) is a story that has been repeated over and over through the ages. That is why ruined temples stand today in Syria on stony hills that were once soil-covered. That is why sand clogs Roman cities in North Africa. That is why mod-

ern Spain is a land of agricultural slums, breeding revolt. That is why "Okies and Arkies" streamed out towards California half a generation ago—and may do so again.

The slogan, "America can feed the world," is a delusion, Dr. Osborn declares; America may soon be having difficulties feeding herself. Even newer lands, like Australia and New Zealand, are already suffering almost as badly as we from the consequences of forest destruction, boom wheat planting, and insane overgrazing.

Nor is much help to be expected from the "undeveloped" humid tropics, he continues, relentlessly. Nobody wants to

live in them anyway, and in any case most tropical soils are no good for really productive farming if they are cleared—and are not then promptly washed away by torrential rains. We shall have to seek our own salvation at home.

"The question remains," Dr. Osborn concludes. "Are we to continue on the same dusty perilous road once traveled to its dead end by other mighty and splendid nations, or, in our wisdom, are we going to choose the only route that does not lead to the disaster that has already befallen so many other peoples of the earth?"

Science News Letter, May 1, 1948

OPHTHALMOLOGY

Less Light for Eye Work

➤ **YOU** don't need nearly as much light for close visual work as the standards recommended by the code of the Illuminating Engineering Society. This is the conclusion of Drs. Ernst Simonson and Josef Brozek, of the Laboratory of Physiological Hygiene, University of Minnesota.

They question the present standards as a result of tests on six young men in good health who each put in two hours of difficult eye work. It was so severe as to be equivalent, the investigators believe, to about six to eight hours in industry. The task was designed to duplicate essentially the recognition of fine details necessary on a conveyor inspection job.

In addition to measuring the work turned out during the two hours, tests were made before and after the work to reveal the extent of fatigue. The experiments were conducted repeatedly at six illumination levels of 2, 5, 15, 50, 100, and 300 footcandles.

The best illumination for this kind of

work was found to be 100 footcandles. This is at or below the minimum recommended by the I. E. S. The scientists on whose work the I. E. S. standards are based recommend as much as 500 to 3,000 footcandles for discriminating fine details.

Increasing the illumination above the optimum of 100 footcandles only resulted in more fatigue and poorer performance, it was found, even when glare was excluded.

A light of 100 footcandles is about that of a 500-watt lamp at a distance of three feet or less. A 300 footcandle illumination would call for a 1,500-watt lamp at the same distance.

The Minnesota scientists have reported their findings in the *Journal of the Optical Society of America* (April).

Science News Letter, May 1, 1948

ORNITHOLOGY

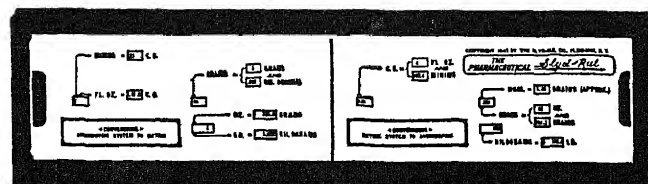
Barn Swallows' Nests Made From Pellets of Mud

See Front Cover

➤ **YOUNG** barn swallows are reared in nests constructed from pellets of mud mixed with pieces of straw and grass, as shown on the cover of this week's *SCIENCE NEWS LETTER*. The nests are generally stuccoed against a barn rafter or joist, and carefully lined with soft feathers. Sometimes as many as a dozen pairs of barn swallows will have nests near each other. As the parent birds flutter around their nests or circle low about the fields their twittering song fills the air with a feeling of good cheer.

Science News Letter, May 1, 1948

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Books of the Week

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A. S. T. M. STANDARDS ON PAINT, VARNISH, LACQUER, AND RELATED PRODUCTS—*American Society for Testing Materials*, 562 p., illus., paper, \$4.35. Specifications, methods of testing, definitions of terms.

BIOLUMINESCENCE—E. Newton Harvey and others—*New York Academy of Sciences*, 156 p., illus., paper, \$2.50. A collection of papers on animal light such as from the firefly and luminous fish and bacteria.

BOTANIK DER GEGENWART UND VORZEIT IN CULTURHISTORISCHER ENTWICKELUNG: Ein Beitrag zur Geschichte der Abendländischen Völker—Karl F. W. Jessen—*Chronica Botanica*, 495 p., paper, \$6.00. An offset reprint edition duplicating exactly a classic in botany originally published in 1864.

CHEMICAL ARCHITECTURE—R. E. Burk and Oliver Grummitt, Eds.—*Interscience*, 202 p., illus., \$4.50. A group of technical papers by authorities in their various fields.

CRYSTALLINE ENZYMES—John H. Northrop, Moses Kunitz and Roger M. Herriott—*Columbia University Press*, 2d ed. rev., 352 p., illus., \$7.50. Containing new material on the synthesis of proteins and the formation of viruses, at least some of which are now believed to be proteins.

THE EARTH'S FACE AND HUMAN DESTINY—Ehrenfried Pfeiffer—*Rodale Press*, 182 p., illus., \$2.75. A book on conservation by a Swiss writer.

THE GENIUS OF INDUSTRIAL RESEARCH—D. H. Killeffer—*Reinhold*, 263 p., illus., \$4.50. This account of how industrial research is conducted is intended especially to guide those entering the field. The illustrations are taken mostly from industrial chemistry.

GUIDE TO EASTERN FERNS—Edgar T. Wherry—*University of Pennsylvania Press*, 2d ed., 252 p., illus., \$2.00. An aid to identification.

HANDBOOK OF APPLIED PHARMACOLOGY—Frederick Schroeder and Arthur W. Grace, Eds.—*Long Island College Hospital*, 133 p., \$2.00. A listing of drugs and recommended dosages, using metric units and including tables of conversion to apothecary system. Chemical preparations are listed under both chemical and proprietary names.

HOW TO TAKE INDUSTRIAL PHOTOGRAPHS

—Moni Hans Zielke and Franklin G. Beezley—*McGraw-Hill*, 113 p., illus., \$5.00. Generously illustrated with photographs, this book should be valuable to both professional and amateur photographer.

LIGNIN, CHEMISTRY AND UTILIZATION—*Northeastern Wood Utilization Council*, 135 p., paper, \$2.00. Report of conference at New Haven, Conn., Sept. 19, 1947.

MALAYSIA, CROSSROADS OF THE ORIENT—Fay-Cooper Cole—*Oregon State System of Higher Education*, 20 p., illus., paper, 75 cents. Anthropological background for an understanding of a part of the world of newly realized importance to us.

NEWER METHODS OF PREPARATIVE ORGANIC CHEMISTRY—*Interscience*, rev. ed., 657 p., \$8.50. A translation of the German *Neuere Methoden der präparativen organischen Chemie*, I.

PERENNIAL HARVEST—Philip Hillyer Smith—*Harper*, 272 p., illus., \$3.00. An account of the rebuilding of an old farm and incidentally of a life.

PSYCHOLOGY AND MILITARY PROFICIENCY: A History of the Applied Psychology Panel of the National Defense Research Committee—Charles W. Bray—*Princeton University Press*, 242 p., illus., \$3.50. Making public the results of important wartime research on the human element in warfare.

THE PSYCHOLOGY OF BEHAVIOR DISORDERS: A Bisocial Interpretation—Norman Cameron—*Houghton Mifflin*, 622 p., illus., \$5.00. The author sees neuroses and psychoses as a community and a national problem. A book of interest especially to physicians and psychologists.

A RUSSIAN JOURNAL—John Steinbeck with pictures by Robert Capa—*Viking*, 220 p., illus., \$3.75. Intended to portray the people of Russia. The numerous photographs are technically beautiful and tell an interesting story.

SMALL-FRUIT CULTURE: A Text for Instruction and a Guide for Field Practice—James Sheldon Shoemaker—*Blakiston*, 2d ed., 433 p., illus., \$4.00. A helpful book for the home gardener as well as the commercial fruit grower.

STARLINGS—Wilfred S. Bronson—*Harcourt, Brace*, illus., \$2.00. You will almost like the starling after reading this delightful book for children of all ages. The beautiful illustrations are by the author.

Science News Letter, May 1, 1948

Over-all length of the elephant shrew, including its seven-inch red-dotted tail, is about 17 inches. Its nose ends in a two-inch proboscis, searching and sensitive as an elephant's trunk. It has a kangaroo-like build, with short forelegs and disproportionately long hind legs.

Science News Letter, May 1, 1948

Science Service Radio

► LISTEN in to a discussion on Tropical Medicine and Malaria Today on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p.m. EDT, Saturday, May 8. Dr. Arnaldo Gabaldon, Venezuelan delegate to the World Health Organization, and Dr. Lewis Hackett, an expert on malaria with the Rockefeller Foundation in Buenos Aires, will be the guests of Mr. Watson Davis, director of Science Service. They will discuss malaria and strange diseases, telling about the diagnosis and the new treatments for these diseases.

Science News Letter, May 1, 1948

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ZOOLOGY

Rare Elephant Shrews Are Captives in New York Zoo

► TWO elephant shrews, an extremely rare species never yet seen outside of its native Africa, have been captured for the New York Zoological Society by the Belgian Congo Expedition now in the field under the direction of Charles Cordier.

• New Machines and

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, P. O. Box 121, D. C. and ask for Gadget Bulletin 412. To receive this Gadget Bulletin without special request call for it.

⚙️ **GARBAGE INCINERATOR** uses the waste itself as fuel. A unique down-draft system draws air from the top through the refuse which dries it as it burns, or even when not ignited. It is claimed to be a safe, sanitary, odorless way of burning all wet or dry garbage and other refuse.

Science News Letter, May 1, 1948

⚙️ **GLASS PARTITION** for office buildings reduces sound transmission as well as heat passage. A unit consists of two or more panes of glass separated by dry air sealed in by metal-to-glass bond. It can be used in ordinary windows to keep out street noises.

Science News Letter, May 1, 1948

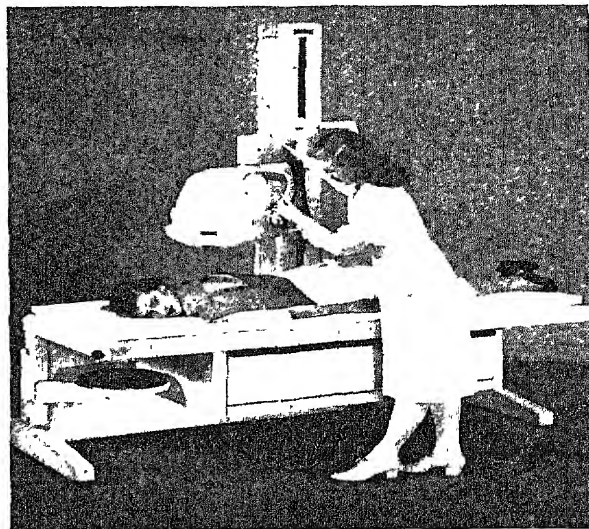
⚙️ **LENSES** to magnify television pictures for the benefit of viewers is made of two sheets of a crystal-clear plastic bonded together to form a hollow cell which is filled with clear mineral oil. This light-weight lens is durable and withstands temperature changes without cracking.

Science News Letter, May 1, 1948

⚙️ **PENCIL SHARPENER**, for the desk or handbag, is in a plastic housing a little larger than a man's thumb, and can make a standard point, draftsman's long-lead blunt or long-lead sharp by regulating a cap at one end. A mere turn of this ball-bearing cap does the sharpening.

Science News Letter, May 1, 1948

⚙️ **X-RAY THERAPY** apparatus, shown



in the picture, is designed particularly for the treatment of skin ailments. It is claimed to produce, in comparison with other machines, an extremely high proportion of "soft" or long-wavelength radiation, which does not penetrate the surface.

Science News Letter, May 1, 1948

⚙️ **ELECTRONIC MICROAMMETER**, claimed to be capable of measuring accurately electrical direct current down to one-billionth of an ampere, is a portable, battery-operated, vacuum-tube meter useful in many fields where extremely small currents are involved. It is of especial value in television and atomic research.

Science News Letter, May 1, 1948

Question Box

ASTRONOMY

What data do scientists hope to get from the annular eclipse? p. 277.

What new developments account for the dawning of a new golden age of astronomy? p. 279.

CHEMISTRY

What advantages are claimed for the new synthetic varnish? p. 276.

What is the secret of making jellied gasoline? p. 274.

Photographs: Cover, George A. Smith, Quarryville, Pa.; p. 275, University of Wisconsin; p. 279, Michigan State College.

MEDICINE

What advantages has radioactive cobalt over radium in cancer treatment? p. 275.

What is the new blue baby disease? p. 275.

OPHTHALMOLOGY

How much light do eyes need for visual work? p. 286.

PHYSICS-PHYSIOLOGY

How does the new heat-measuring instrument work? p. 278.

What damage to bodily structure can result from high intensity sound? p. 274.

Gadgets

SCIENCE NEWS LETTER, 1719 N St., Washington 6, D.C. each week, remit \$1.50 for one year's subscription.

⚙️ **TRIANGULATOR**, one use of which is to aid an editor in selecting a portion of a photograph for reproduction, has two graduated arms at a right angle, and two sliding arms, to make a rectangle of any size desired, under which the picture is placed. When an attached wire is positioned diagonally, every composition within the rectangle is directly proportional to the rectangle.

Science News Letter, May 1, 1948

⚙️ **ENGLISH HAIRBRUSH**, that imparts perfumed fragrance to the hair while brushing it, contains a refillable bristle base which is detachable from its plastic handle for convenience in washing and cleaning. Behind the bristle base is a special pad which can be saturated with any perfume desired.

Science News Letter, May 1, 1948

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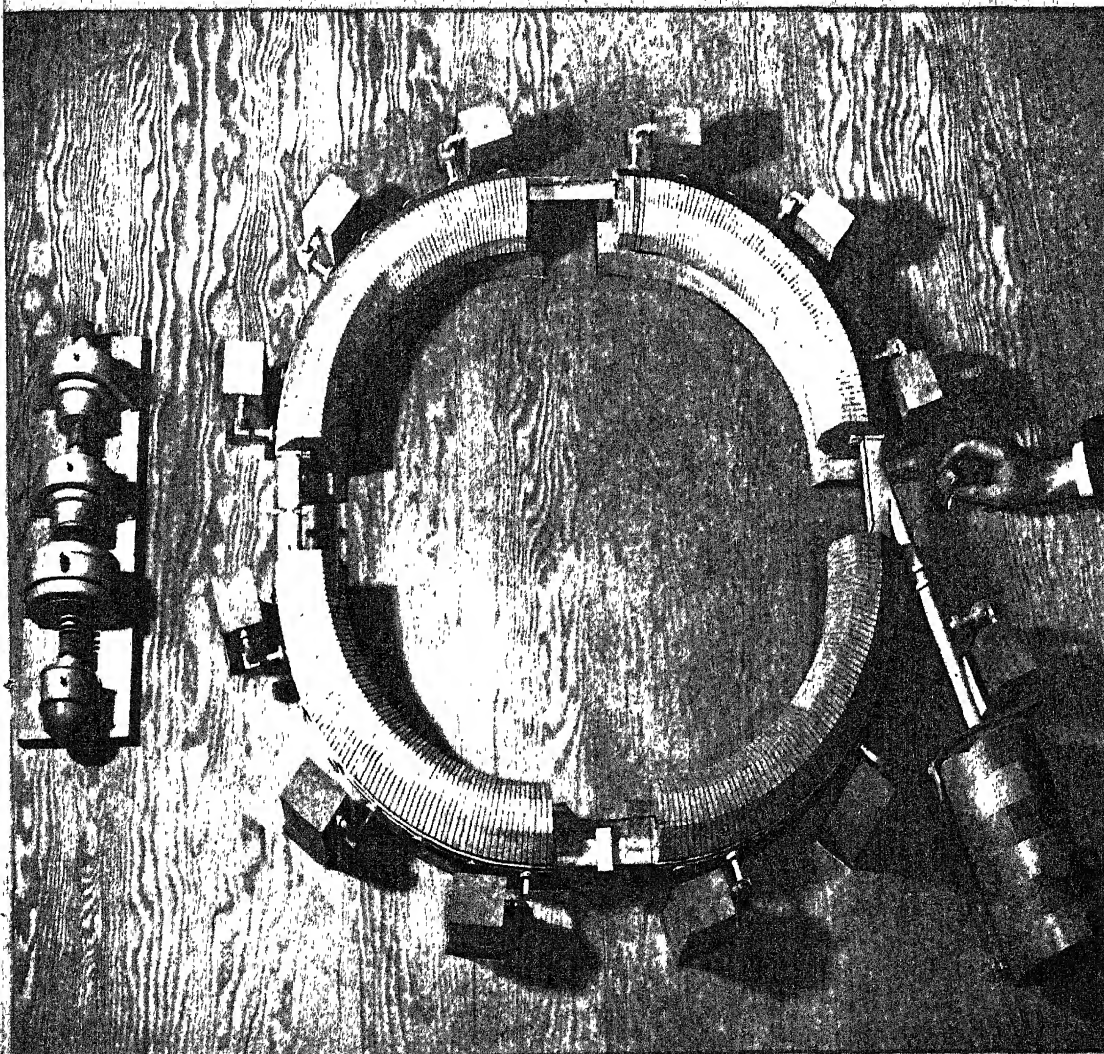
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Vol. 53, No. 19

THE WEEKLY SUMMARY OF CURRENT SCIENCE • MAY 8, 1948



Model of a Giant

See Page 291

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Traffic is heavy under the street, too

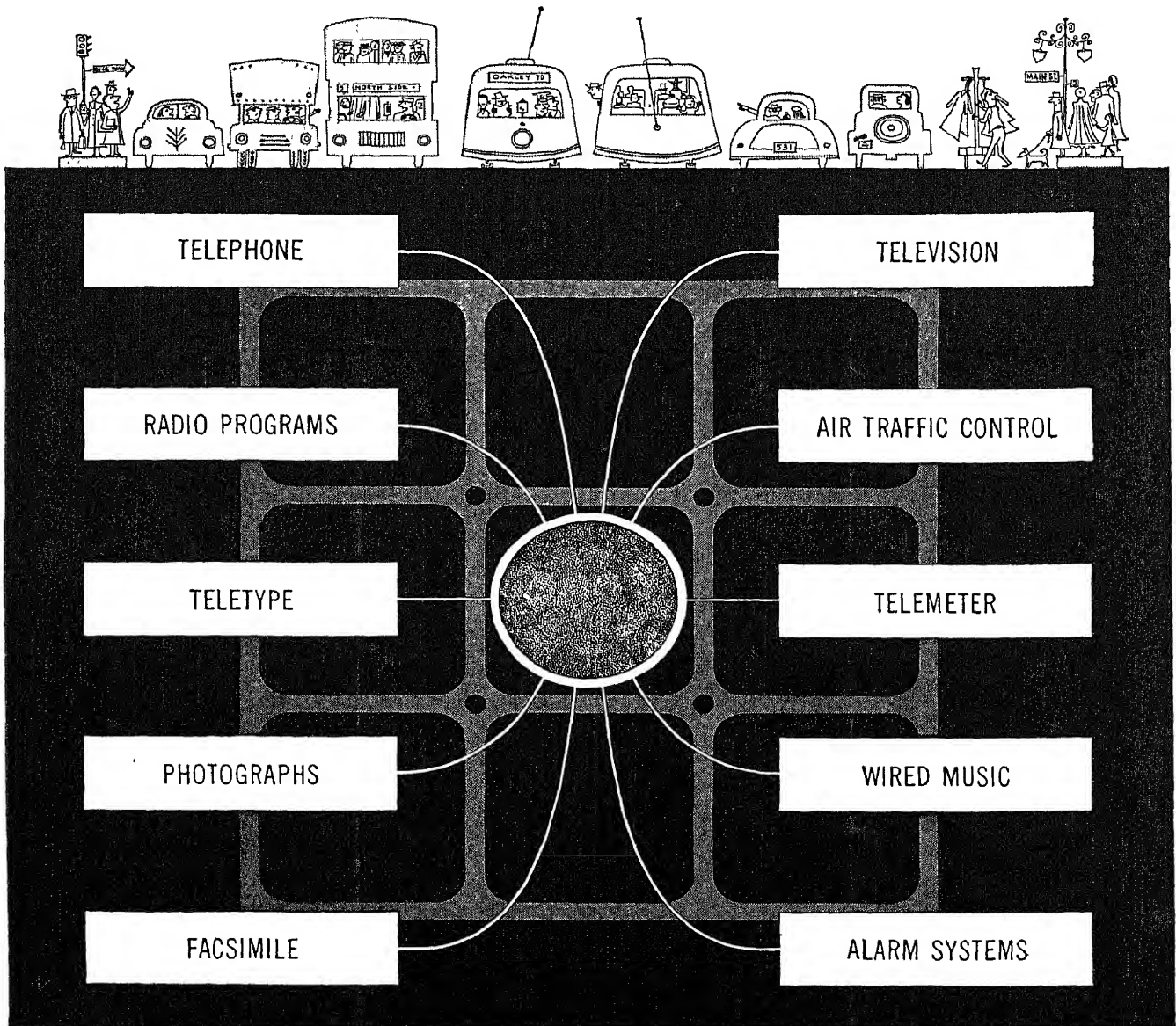
Surely the busiest thoroughfare in the world is a telephone cable.

But it is more than "telephone"; for these thousand or more wires in the cable, carrying sound and pictures at lightning speed, are highways for many different communication services.

Each one of these presents its own problems to Bell Laboratories scientists and engineers: for the telephone differs from television, and television differs from a radio program.

And yet they have an essential unity: they involve transmission of alternating currents, with frequencies from zero up to several million cycles. Each calls for new thinking, new ideas, new goals of accomplishment.

The diversity of the cable's many services speaks for the unity of Bell Laboratories' purpose. That is, to know the theory of communication so thoroughly, to practice the art so skilfully, that any transmission of sight or sound can reach its destination clearly, quickly, economically.



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PHYSICS

Two Giant Atom Smashers

Both promise to operate in the energy range of cosmic rays. They will be built within the next few years with \$11,000,000 of A. E. C. Funds.

See Front Cover

➤ TWO new gigantic "atom smashers" or electronuclear machines, both of which promise to operate at billions of electron volts in the energy range of the cosmic rays, will be built in the next few years with \$11,000,000 of Atomic Energy Commission funds. The largest, a 110-foot cyclotron, will be at the University of California's Radiation Laboratory at Berkeley. The other, a 30-foot synchrotron, will be built at the Brookhaven National Laboratory, Upton, Long Island, N. Y.

California Cyclotron

About ten billion electron volts, enough energy to exceed the most powerful cosmic rays from the depths of the universe, will be produced by the \$9,000,000 Berkeley cyclotron.

This will multiply about 20 times the power of the largest cyclotron now operating, the 184-inch atom smasher also at Berkeley, which only a few weeks ago produced man-made mesons for the first time by bombardment with 400,000,000 electron-volt particles.

The new machine will be a gigantic affair 110 feet in diameter with a circular housing around the rim. Atomic particles will speed around it under the influence of 10,000-tons of magnet, like an immense merry-go-round. Protons, the hearts of hydrogen atoms, will be fed into the machine. Mere men operating it will be dwarfed by the apparatus.

The planning for the new giant among atom smashers was under way many months ago. W. M. Brobeck, who did the engineering design of the present world's largest cyclotron, determined that it would be feasible to build and operate a great proton accelerator at ten billion electron volt level.

Dr. Ernest O. Lawrence, whose invention and operation of the cyclotron won him the Nobel Prize, will direct the new one, which will take five years to build. He first announced the possibility of the ten billion electron volt machine at a lecture at Yale's Centennial Celebration of the Sheffield Scientific School last October (See SNL, Oct. 25).

Plutonium, the atomic bomb element,

was first created in one of the smaller cyclotrons, and so were the other three elements heavier than uranium.

The magnet will be divided into four segments, the four gaps providing access to the accelerating chamber for such equipment as vacuum pumps and the high frequency equipment which accelerates the protons.

As protons pass the accelerating electrode point on each trip around the magnet, they will be struck by a high frequency charge of either 2500 or 5000 volts. With 5000 volts on the accelerating electrode, each particle would make more than one million trips around the chamber before reaching six billion electron volts.

Operation of the great atom smasher will be pulsed; that is, it will operate for about two seconds at a time, then will be turned off for a few minutes.

Brookhaven Machine

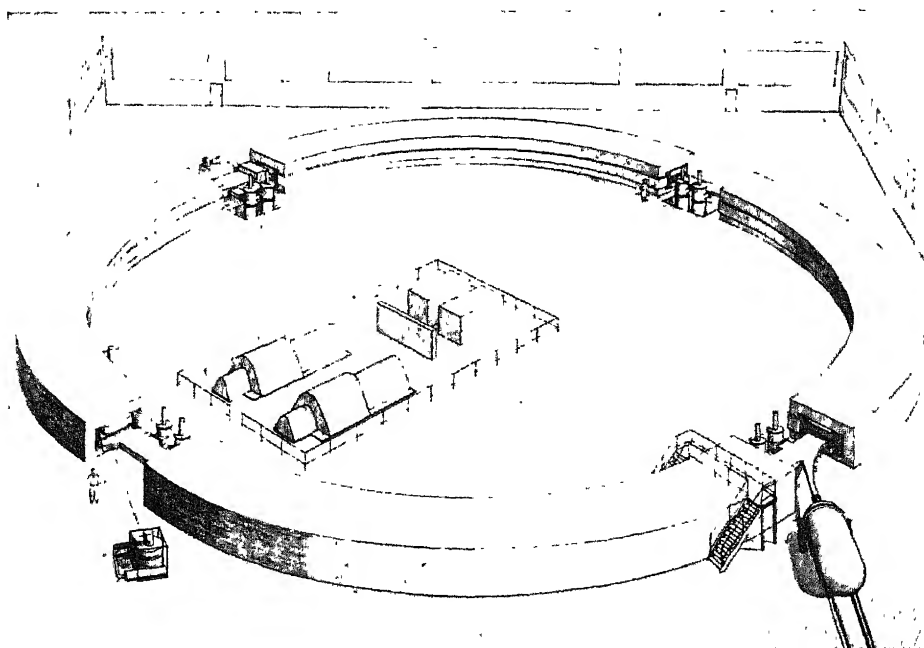
Three billion electron volts will be the energy of the protons to be accelerated

in the 30-foot machine to be built at Brookhaven National Laboratory in about three years at a cost of \$3,000,000.

In the operation of the machine, the protons will travel repeatedly around a fixed orbit consisting of four quadrants of a circle 30 feet in radius, alternating with four straight lines about 10 feet in length. The path the protons will follow will have the appearance of a circle flattened at four equally spaced points around its circumference. The total distance travelled in one revolution will be about 230 feet and a proton reaching its peak energy will make about 3.5 million revolutions, a distance of about 150,000 miles. It will travel this distance in less than a second.

The scale model of the three billion volt proton accelerator to be built at Brookhaven is shown on the cover. At top is model of motor generator set which will supply power to the magnet. The magnet is the ring (60 feet across left to right), inside which the particles are accelerated in a vacuum in a "doughnut" shaped course made of a ceramic. Particles are launched at four million volts from the Van de Graaff generator represented at the lower part of the picture.

Design of the Brookhaven machine was by a group headed by Dr. M. Stanley Livingston, on leave of absence from Massachusetts Institute of Technology.



ATOM-SMASHER—Plans for building this gigantic machine are now under way at Berkeley. It will accelerate protons, the nuclei of hydrogen atoms, to 10 billion electron volts. (From SNL, Nov. 1.)

Lincoln Library

What Machines Will Do

A continuing attack on the fundamental structure of the heart or nucleus of the atom, the prime problem in physical science, is the objective of the new cyclotrons. There is still much to be learned and enticing theories to be tested.

Both equipments will mobilize the most advanced developments in atom smashers in recent years. Particularly important to operation are the concepts proposed in 1945 by Dr. E. M. McMillan, professor of physics in the University of California's Radiation Laboratory, which made possible the synchrotron and synchro-cyclotrons.

In the giant cyclotron, which is sometimes called a synchro-cyclotron, the frequency of the electrical charge used to accelerate particles is slowed down because the speeding particles tend to lag a little at higher energies. Thus the acceleration is synchronized to accommodate the laggard particles.

In the synchrotron, which accelerates electrons, the synchronization is accomplished by increasing the strength of the magnetic field of the ring-shaped magnet. This jerks the lagging electrons up to the accelerating point in time to receive regularly spaced jolts of high energy power.

One possibility of the new giant cyclotrons will be the production of large number of mesons, in pairs, with which it might be possible to fission chemical elements other than uranium, thorium and plutonium with release of atomic

energy. This is a theory that scientists are anxious to test. It may possibly give rise to new kinds of atomic bombs or other applications of atomic energy.

Dr. Philip M. Morse, director of Brookhaven, explained:

"Nuclear physics today is in a position of development which can be compared to that of chemistry 50 years ago. At that time chemists knew a great deal about valences and combining weights of elements, but did not know how the forces acted which made molecular bonds. In the last 50 years this has come to be well understood. In nuclear physics today we know that atomic nuclei are held together by some new force—we call it nuclear force—and we know it is not an electrical, chemical or gravitational force, and that it is specifically a nuclear phenomenon. To study and understand this new force we must have instruments which will make or break this force at will under controlled laboratory conditions.

"The best theories concerning this force find it necessary to talk of interchange of charge between particles in the nucleus. This interchange of charge is supposed to be accomplished by means of a meson which is shared alternately by different particles within the nucleus. With new and higher energy accelerators we hope to be able to gain experimental evidence which will clarify or substantiate these theories, and lead to broad extensions of our present knowledge of the nucleus."

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This illusion is like that noticed when you drive past a picket fence. If you are standing still, the pickets block your view so that you cannot see what is behind the fence. But if you are moving at the right speed, and the pickets are not too close together, you will get a view of what is behind the fence and the pickets, if you see them, will appear no more than a vague blur.

The intelligibility of conversation is less, if it comes in abruptly and is chopped off suddenly. You can make out more in the same length of time if it comes in and fades out more gradually.

These investigations were reported to the meeting by Drs. George A. Miller and J. C. R. Licklider of Harvard and Dr. W. R. Garner of the Johns Hopkins University.

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PSYCHOLOGY

Noise Doesn't Mask Talk

➤ ALTHOUGH a loud continuous noise will "drown out" another noise and make conversation impossible, the effect is entirely different if the masking noise is intermittent, as in a burst of machine-gun fire.

Interrupting the noise cuts down on its effectiveness as a mask, but the extent to which it is cut down depends also on the frequency of the interruption, on the pitch of the drowned-out sound and on the loudness of the noise. This is shown by research at the Harvard Psycho-Acoustic Laboratory reported at the meeting of the Acoustical Society of America in Washington.

If the noise is on and off only once in ten seconds, the conversation can be heard without too much difficulty. But, on the other hand, if the interruption is

very high—on and off 5,000 times a second—you can hear almost as well as if there were no noise.

If you are listening to speech accompanied by a noise that is interrupted 300 times a second, the speech will sound intermittent to you, but you will hear practically every word just as if you were listening in a quiet room.

A curious effect was discovered, however, when the investigators tried filling in the intervals between words with a noise. For this purpose they used what scientists call "white noise," that is, a noise containing all the frequencies at random.

Now the speech no longer sounded intermittent. The words were understood just as well as when there was no "masking" noise.

ASTRONOMY

Earth's Growth Stunted

Theory of arrested growth in youthful period of four planets closest to the sun is advanced by Purdue physicist. They include Mercury, Venus, Earth and Mars.

➤ THE four planets closest to the sun—Mercury, Venus, our own earth and Mars—never quite grew up. Their growth was stunted when they were young. They took on weight, but failed to balloon in size like Jupiter and the other planets farther away from the sun.

This picture of the creation of the solar system is advanced by Dr. D. ter Haar of Purdue University's Department of Physics.

The solar system did probably start from a sun surrounded by a gaseous envelope just as the German philosopher, I. Kant, thought, Dr. ter Haar reasons. Likewise the six planets that have satellites began as bodies with extended atmospheres.

Atmospheres Around Planets

When they were being created, the outer planets were surrounded by atmospheres, but the inner planets had practically none. As a result, today the outer planets such as Saturn and Jupiter are surrounded by extensive satellite systems while the inner planets possess only a few of the known satellites.

The original solar envelope contained between one-tenth and five-tenths of the solar mass, the Purdue physicist calculates.

➤ Three distinct steps followed in the creation of the planets by condensation are reported to be:

1. The formation of nuclei for further condensation.

2. The growth of these nuclei.

3. The capture of additional light compounds by gravitation. The planets are pictured as growing much faster during the last stage when they captured numerous gas molecules than during the first two.

The first two stages, Dr. ter Haar figures, are similar to the formation of drops of moisture in a supersaturated vapor. The temperature determines which compounds are supersaturated at a given density.

In the gaseous disk from which the planets were created, the temperature decreased with increasing distance from the center. Consequently, in the regions nearer to the sun fewer compounds took part in the initial condensation phases

than in the outer regions of the solar system.

"It now turns out," Dr. ter Haar states in the journal, *Science*, (April 23) "that in the regions of the solar system where the terrestrial planets are found, only inorganic compounds will condense. In the regions of the outer planets, however, both organic and inorganic compounds can condense. It is very remarkable that the change-over from inorganic to organic compounds lies just in the region between the inner and outer planets."

Two results follow, Dr. Ter Haar calculates. First, there will be fewer condensation nuclei in the inner parts of the system than in the outer parts. Secondly, the specific density of the condensation nuclei in the inner regions will be higher than that of the nuclei in the outer regions. From this alone, we could expect heavy, small inner planets and light, large outer ones.

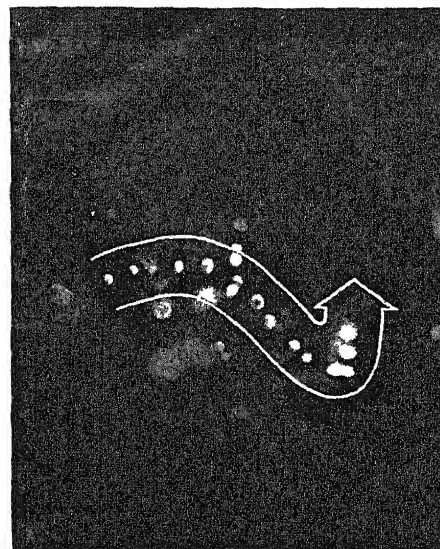
The inner planets grew more slowly than the outer planets during the first two stages. Therefore the outer planets may well have reached the third stage before the envelope surrounding the sun had dissipated very much. But by the time the inner planets had reached the size that gravitational effects would be important, the gaseous envelope had practically dissipated and appreciable further growth was impossible.

Third Stage of Growth

In the building up of the outer planets, about 20 times as much matter in the sun's gaseous disk took part as was used in the formation of the inner planets. By failing to grow up fast enough, these were cheated out of the third stage of their growth, that of acquiring lighter gases by gravitational capture.

A qualitative analysis such as this, Dr. ter Haar reports, shows that the theory advanced by Kant in the middle of the eighteenth century is stronger than was suspected. It is thus rather satisfying to find, he says, that the differences between the inner and outer planets can be explained by the Nebular Hypothesis, the simplest possible explanation of how the solar system came into being.

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ELUSIVE ELECTRON—The first definite tracks of electrons, particles that make up atoms, are shown in this picture, developed after an electron sped through the emulsion, striking silver grains in its path. This shows an enlargement of a 13-grain track. X-rays, filtered through lead, were used to start the electrons flying into this new type of Eastman plate.

PHOTOGRAPHY

Electron Tracks Captured On New Photographic Plate

➤ ELECTRONS, known as particles of electricity, are the commonest of the fundamental bits of matter, and scientists work with them daily.

Yet only now have electron tracks been definitely photographed. Eastman Kodak scientists announced that tracks about two thousandths of an inch long—less than the thickness of this piece of paper—have been captured in a special photographic emulsion.

Science News Letter, May 8, 1948

GENERAL SCIENCE

Three Medals Awarded at National Academy Meeting

➤ THREE medals were awarded in absentia to scientists at the annual meeting of the National Academy of Sciences.

Dr. Alexander G. Vologdin, a corresponding member of the Academy of Sciences of the U.S.S.R. and a distinguished scientist of the Paleontological Institute in Moscow, received the Charles Doolittle Walcott bronze medal and award for 1947 for his researches on the

early Cambrian organisms, *Archaeocyatha*.

Dr. Felix Andries Vening Meinesz, professor of geodesy and geophysics in the University of Utrecht and President of the Netherlands Geodetic Commission, was awarded the Agassiz gold medal and honorarium for 1947 for his contributions to oceanography. Prior to the invention of his multiple pendulum

apparatus, measurements of gravity could not be accurately determined on unstable ground.

The Henry Draper medal for 1947 was conferred on Dr. Hans Albrecht Bethe, professor of physics at Cornell University, for his quantitative solution for the source of the tremendous flow of energy from the sun and stars.

Science News Letter, May 8, 1948

GENERAL SCIENCE

New Science Accolades

Elections to National Academy of Sciences and American Philosophical Society include three Nobelists and plutonium discoverer. Fourth woman academician named.

➤ WHEN she was elected to the most exclusive science society in America, the National Academy of Sciences, Dr. Gerty T. Cori, of Washington University Medical School, St. Louis, added this honor of being the fourth woman academician in history to a similar election a few days earlier to the American Philosophical Society, with almost as restricted a membership.

She thus joins her husband fellow-scientist in membership in these two leading societies as well as the Nobel prize given them last fall.

The discoverer of plutonium, Dr. Glenn T. Seaborg, University of California chemist, was another scientist elected to the Academy.

Prince Louis de Broglie, Nobelist and famous French theoretical physicist, and Dr. Ronald A. Fisher of Cambridge, England, leading statistician, were elected foreign associates of the Academy.

The discoverer of the neutron (the atomic particle that is trigger of the atomic bomb) Sir James Chadwick of Liverpool, England, was elected a foreign member of the American Philosophical Society, as was Dr. Otto Lous Mohr, president of the University of Oslo.

The physicist-member of the Atomic Energy Commission, Dr. Robert F. Bacher, was elected a member, as was Frederick Osborn, U. S. representative on the UN Atomic Energy Commission, who was made a member in the social science section.

Other new members elected to the National Academy of Sciences are:

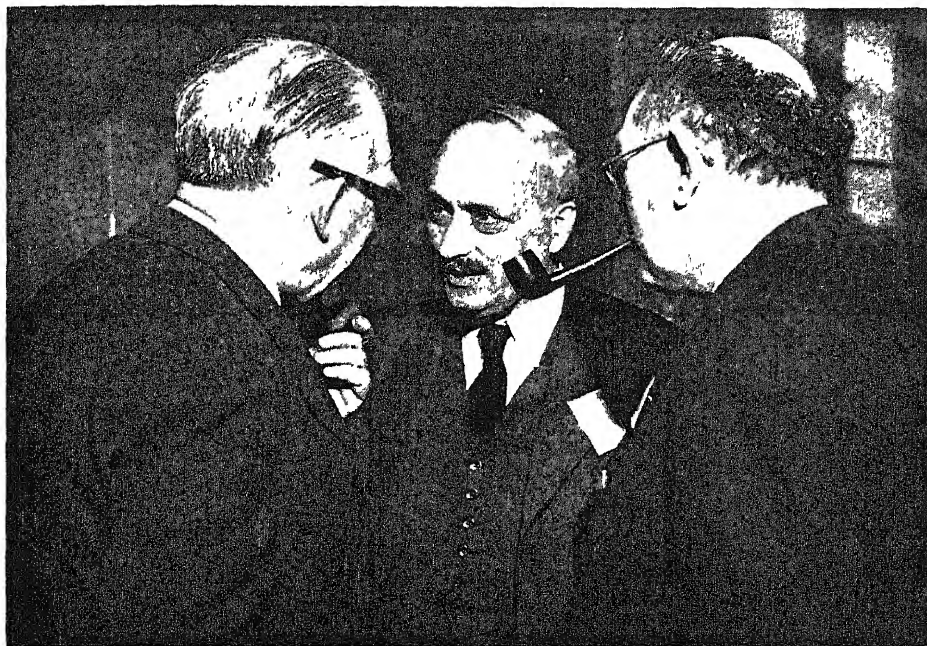
Eric G. Ball, professor of biological chemistry, Harvard Medical School; Lloyd V. Berkner, chairman of the Section of Ex-

ploratory Geophysics of the Atmosphere, Carnegie Institution of Washington; Felix Bloch, professor of physics, Stanford University; Hallowell Davis, director of research, Central Institute for the Deaf, research professor of otolaryngology, Washington University; John R. Dunning, professor of physics, Columbia University; W. Maurice Ewing, head of department of geophysics, Columbia University; Karl Folkers, assistant director of research, Merck and Co.; Thomas Francis, Jr., professor of epidemiology and chairman of the department, School of Public Health, University of Michigan; Edwin

R. Gilliland, professor of chemical engineering, Massachusetts Institute of Technology; Haldan K. Hartline, associate professor of biophysics, Hospital of the University of Pennsylvania; Ernest R. Hilgard, chairman of the department of psychology, Stanford University; Frank L. Horsfall, Jr., member, Rockefeller Institute for Medical Research; John R. Johnson, professor of chemistry, Cornell University; Raymond A. Kelsler, dean, School of Veterinary Medicine, and professor of bacteriology, University of Pennsylvania; Cyril N. H. Long, chairman of department of physiological chemistry, Yale University School of Medicine; Edward J. McShane, professor of mathematics, University of Virginia; Donald H. Menzel, chairman of department of astronomy, Harvard University, associate director for solar research, Harvard College Observatory; C. W. Metz, chairman of department of zoology, University of Pennsylvania; Curt P. Richter, associate professor of psychobiology, Johns Hopkins University; Hermann I. Schlesinger, professor of chemistry, University of Chicago; Francis O. Schmitt, head of department of biology and biological engineering, Massachusetts Institute of Technology; Gilbert M. Smith, professor of botany, Stanford University; Curt Stern, professor of zoology, University of California; Chester Stock, professor of paleontology, California Institute of Technology; James B. Sumner, professor of biochemistry, Cornell University; Edward Teller, professor of physics, University of Chicago; Kenneth V. Thimann, associate professor of botany, Harvard University; Charles A. Thomas, executive vice president, Monsanto Chemical Company.



ACADEMY MEETING—Among the scientists attending the annual meeting of the National Academy of Sciences were (left to right): Dr. Th. G. Sahama, visiting Finnish scientist at the Geophysical Laboratory, Carnegie Institution of Washington; Dr. Felix Chayes, Geophysical Laboratory, Carnegie Institution of Washington; Dr. K. J. Neuvonen, visiting Finnish scientist at the Geophysical Laboratory, Carnegie Institution of Washington; and Dr. W. H. Bucher, professor of structural geology, Columbia University.



NOBELISTS ATTEND ACADEMY MEETING—Three Nobel prize winners who attended the National Academy of Sciences meeting were (left to right): Dr. Niels Bohr, physicist, Institute for Theoretical Physics, Copenhagen, Denmark; Dr. J. Franck, professor of physical chemistry, University of Chicago; and Dr. Otto Stern, physicist, Carnegie Institute of Technology.

Other scientists elected new members of the American Philosophical Society include:

Farrington Daniels, physicist, University of Wisconsin; Zay Jeffries, metallurgist, General Electric Co.; Samuel S. Wilks, professor of mathematics, Princeton University; Vladimir Kosma Zworykin, television inventor, RCA Laboratories; Elmer G. Butler, chairman of the department of biology, Princeton University; Chester Ray Longwell, professor

of geology, Yale University; Eli K. Marshall, professor of pharmacology and experimental therapeutics, Johns Hopkins University; Louis L. Thurstone, professor of psychology, University of Chicago; Cornelis Bernardus Van Niel, professor of microbiology, Stanford University.

Dr. Edwin G. Conklin of Princeton was elected president of the American Philosophical Society.

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PHYSICS

Spying on Growing Cells

New kind of microscope, which may uncover many important facts about life processes, color "stains" with light waves without harming the living cells.

➤ **COLOR** "staining" with light waves without killing the living cells is a new microscopic technique that is expected to reveal much about important life processes.

This new kind of microscope, a further development of the phase microscope, will permit man to spy upon cells as they grow, multiply and carry on their important life functions. It will let scientists see in color, for the first time, both normal and cancerous growth, and may help them discover what the abnormal growth is.

But this latest development in microscopy is still very much in the experimental stage. Many refinements may be expected before instruments of this type are made available to scientists for important research.

The instrument, reported to the National Academy of Sciences meeting in Washington, was developed by Dr. F. Zernike, the Dutch physicist who visualized and made the first phase microscope. Dr. Zernike, professor of physics at the University of Groningen, the Netherlands, this year is visiting profes-

sor of physics at the Johns Hopkins University in Baltimore.

The ordinary phase microscope uses two transparent rings to reveal, in black and white, details heretofore unknown concerning delicate cell structure. Two optical companies are now making instruments of this type available commercially in America.

The phase ring separates a small portion of light and distributes it over the whole field. It works because it takes advantage of the fact that light travels in waves.

This separated light, spread over the whole image, promises an evenly illuminated background. The image appears bright where the phase of the direct light is the same as that of the background light so that it is reinforced. It shows dark when the phases of the two light parts are different so that by interference they destroy each other.

In the new color phase microscope, the ring works in an opposite way in the red than in the green end of the spectrum, giving some details more red light, others more green, depending on their thickness.

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BIOLOGY

Cytoplasm Chooses Genes Actually To Be Developed

➤ **GENES**, the still-unseen chemical units that determine heredity in animals and plants, are not necessarily as omnipotent as some biological thinking would hold them to be, Dr. T. M. Sonneborn of Indiana University suggested. The cytoplasm, or general protoplasm of the cell, can have something to say about what the offspring will be like, he declared at the meeting of the National Academy of Sciences in Washington.

His studies of the one-celled animal form known as Paramecium indicate that while the genes do determine what characters the coming generation may possess, the cytoplasm "picks out" the ones that are actually going to be developed. This is possible in Paramecium because in these primitive creatures the cytoplasm is a well-developed, active part of the organism when the new generation gets its start. In the beginning-cells of higher animals and plants the cytoplasm is new, undeveloped, "inexperienced," hence has little or nothing to say about the fate of the genes.

Science News Letter, May 8, 1948

GENETICS

Mother-Daughter Conflict Seen in Some Plant Seeds

➤ THE mother-daughter conflict often dramatized by playwrights and novelists has a curious counterpart in the plant world, where a plant will go through all the trouble of forming a seed—and then prevent the seed from ever sprouting. At the meeting of the National Academy of Sciences in Washington, Dr. H. A. Brink of the University of Wisconsin called attention to this peculiar situation.

A seed, Dr. Brink reminded his audience, is really a mosaic structure, composed of at least three different kinds of tissue from the genetic point of view. The tiny embryo plant within, waiting its chance to grow, is definitely the offspring generation. The tough outer coats that cover it are really parts of the mother plant's body-substance. And the "lunch" of stored food in the seed, technically known as the endosperm, is neither one nor the other, but an entity of its own.

It often happens, especially in the seeds of hybrid plants, that the maternal structures in the seed-coat do not make way when the embryo is ready to start developing and make its own way in life. Frequently, when some exceptionally valuable hybrid seed develops this difficulty, it becomes necessary to break down this "parental objection" by outright force, to give the new generation its chance to grow.

Science News Letter, May 8, 1948

PLANT PHYSIOLOGY

Piled-Up Food Checks Plant Growth Efficiency

➤ THE little green food factories in the leaves of plants have the same kind of difficulty that their larger man-made counterparts sometimes run into—their product tends to pile up faster than it can be removed and used up, with resulting interference with operational efficiency.

This picture of bottlenecks in natural production processes was presented before the meeting of the National Academy of Sciences in Washington by Dr. F. W. Went of the California Institute of Technology. The experiments he reported were made on tomato plants, but general conclusions based on the results are applicable elsewhere in the plant kingdom as well.

Green plants need a lot of light before they produce enough food to use in

growth, Dr. Went found. An illumination of 1,200 foot-candles proves a limiting factor.

But this gets crossed up with a temperature effect, which cuts the amount of sugar transported within the plant as it gets warmer. Since the plant receives both light and warmth from the sun, simultaneous increases in both kinds of radiation often work at cross-purposes. If the temperature remains high at night, as it does in a greenhouse, night growth is seriously hampered because the necessary materials cannot reach the growing points fast enough.

A practical way to overcome this handicap is to sprinkle sugar solution on plants in the greenhouse at night. They readily absorb the sugar through their leaves, and thus have more food material which can be built into the substances needed by the plant for its growth.

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ELECTRONICS

New Cesium Vacuum Tube Changes Electric Current

➤ A NEW vacuum tube for changing alternating into direct current, applicable to 110 volt supply such as used in ordinary commercial service, was announced to the National Academy of Sciences, meeting in Washington, by Dr. A. W. Hull of the General Electric Company.

This rectifier uses cesium metal both as coating for the hot cathode and as current-carrying vapor. This double use of cesium gives the highest efficiency theoretically obtainable in a thermionic rectifier, combined with unlimited life.

For rectifying and controlling currents at high voltages, Dr. Hull also described a new high-voltage thyatron, which will be used in power supply for television transmitters and for direct current power transmission. A new and efficient long-life cathode for thyatrons, which will handle currents as high as 5,000 amperes, was also described.

A new method of detecting and measuring atomic disintegrations that are of such low penetrating power that they can not escape from the vacuum chamber was described by Dr. Samuel K. Allison of the University of Chicago. He compared this atom study to measuring what happens by observing the recoil of a gun instead of following the flight of the bullet. An electron multiplier tube is used and its recording depends upon electrons being ejected from metal surfaces when they are hit by the primary particles.

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PUBLIC HEALTH

We'll Be Lots Healthier Ten Years from Now

➤ AS a nation, we will be much healthier 10 years from now if we follow the 10-year plan expected to be drawn by the National Health Assembly, which held its meeting in Washington recently.

And if everybody gets together and cooperates on the plan, we can start showing improvement a lot sooner, Oscar V. Ewing, Federal Security Administrator, told a nation-wide radio audience. Mr. Ewing spoke as guest of Watson Davis, director of Science Service, on Adventures in Science, radio program presented under the auspices of Science Service over the Columbia Broadcasting System.

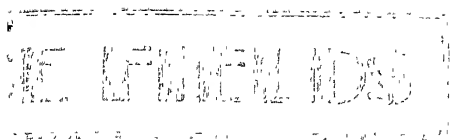
More and better sanitation, more hospitals and health centers, more doctors, nurses and other health personnel, and more research to fight such chronic diseases as cancer, heart disease and mental illness are needed to improve our health, Mr. Ewing said.

"A breakdown of the statistics shows that good health varies widely among the states of the Union and even among the localities within the different states," he pointed out. "It varies also as to age-groups and income levels. As for public health services, federal funds, you know, are appropriated in relation to the money the various states and communities can themselves raise, and the poorer states and communities get the short end of it."

"Nearly a sixth of our entire population is afflicted with chronic disease. And outside of all the suffering and misery this entails, we have to realize that we are losing at least a billion workdays every year from this cause. Diseases of the heart alone cost the American people a billion dollars annually and mental diseases another billion and a half."

"We take sanitation too much for granted," Mr. Ewing continued. "More than six million persons live in towns and cities which need new sewerage systems. Over 79 million need improved systems. And today only about six and a half million people are served by systems that could be termed really adequate. And this doesn't include the even worse conditions in our rural areas."

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GEOLOGY

Earth's Early Magnetism To Be Tested with Clays

➤ HOW the compass would have pointed a hundred million years ago—if the compass had existed then—will be discovered this year by an expedition of the Carnegie Institution of Washington to collect clays from the western United States from Colorado to Washington.

Just why the earth is a giant magnet is still one of the major mysteries of science, Dr. E. A. Johnson of the Carnegie Institution told the American Physical Society meeting in Washington, despite the fact that scientists are now sure that earth had a magnetic field at least a million years ago.

What amount to tiny magnets in the clay particles laid down in ancient glacier lakes or on the ocean bottom can be used to determine the strength and direction of the magnetic field when the clay beds were formed.

Glacial clays from New England and sediments from the bottom of the Atlantic and the Pacific formed a million years ago have been collected by the scientists. Pieces of the material are spun near a coil and extremely sensitive amplifiers are used to pick up the very small voltages generated. From these there can be figured the strength of the earth's magnetic field in which they were deposited.

A million years ago the earth's magnetism was just about what it is now. Seeking clays of earlier geological ages, the scientists will find records of the earth's magnetism still earlier.

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ENGINEERING

Radar Technique Enters Land-Surveying Field

➤ AN optical radar for surveying earth surfaces has been developed, the International Scientific Radio Union was told at its meeting in Washington by W. W. Hansen, Illinois Institute of Technology, Chicago. It sends out pulses of light which are reflected back from the point whose position is to be determined, and the distance is measured by the time the light takes to travel forward and back.

The light returning from the reflector falls on a photo-multiplier whose output is amplified to produce a pip, an illuminated spot, on a cathode-ray tube. Determining the distance by the transit time of the pulse of light is accomplished by auxiliary circuits which include a local crystal-controlled oscillator. The circuits produce timing markers on the tube which can be made to match the pip produced by the returning light.

Angles are measured as with the conventional surveyor's transit. The optical system makes use of a single parabolic searchlight mirror, the outer portion of which is used for the transmitted beam, while the inner portion is used for the returned beam. The equipment is portable and operates alternatively from storage batteries or from 110-volt alternating current.

Science News Letter, May 8, 1948

AERONAUTICS

Sound Waves Measure True Airplane Speed

➤ TRUE airplane speed may be measured accurately by high frequency sound waves, the Acoustical Society of America was told at its meeting in Washington by Victor B. Corey, of Frederic Flader, Inc., North Tonawanda, N. Y. The Mach number, the ratio of plane speed to the velocity of sound, can also be measured by the same means.

The instrument, developed for the purpose, was described by the scientist as using the convection refraction of high frequency sound waves sent out from an extensible boom carrying a device to give out sound waves. True air speed, which involves the ratio of distance to time, is proportional to the ratio of boom extension to a measured acoustic transit time which remains constant excepting for temperature changes of the air.

The device is made automatic by what is called a servo-positioning mechanism which moves the boom in response to a signal from a dual receiver in a fixed parallel boom. The basic operating principles, he stated, are applicable in general to velocity or Mach number measurements on a body which moves through any fluid medium of low viscosity.

The measuring instrument, developed at Cornell Aeronautical Laboratory under contract with the U. S. Navy, is named STAMNI for short, the full name being Sonic True Air Speed and Mach Number Indicator.

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GENERAL SCIENCE

Two New Trustees Elected To Science Service

➤ DR. KARL LARK-HOROVITZ, chairman of the department of physics of Purdue University, Lafayette, Ind., and Charles E. Scripps of Cleveland, Ohio, have been elected new trustees of Science Service, the institution for the popularization of science, with headquarters in Washington.

Mr. Scripps represents the E. W. Scripps Estate of which he is a trustee, while Dr. Lark-Horovitz represents the American Association for the Advancement of Science of which he is general secretary.

The following officers were renamed in annual meetings just concluded:

Dr. Harlow Shapley, *President*, Director of Harvard College Observatory, Cambridge, Mass.; Dr. Alexander Wetmore, *Vice-President and Chairman of the Executive Committee*, Secretary of Smithsonian Institution, Washington, D. C.; O. W. Riegel, *Treasurer*, Director of Lee School of Journalism, Washington and Lee University, Lexington, Va.; Watson Davis, *Secretary*, Director of Science Service, Washington, D. C. Additional members of the Executive Committee are Frank R. Ford, Editor, Evansville Press, Evansville, Ind.; and Dr. E. G. Conklin, Princeton University, Princeton, N. J.

Science News Letter, May 8, 1948

MEDICINE

Medical War Crimes To Be Outlawed Internationally

➤ MEDICAL war crimes will be outlawed ethically, if the newly-organized World Medical Association carries out its present plans.

Doctors all over the world, according to this plan, will take an oath refusing to perpetrate experimental and non-experimental crimes and human barbarities such as German physicians were involved in during World War II. They will take this oath when they receive their degrees of doctor of medicine, just as U. S. physicians now take the age-old Hippocratic oath on receiving their medical degrees.

Adoption of this oath was urged in a resolution by the World Medical Association at its first meeting in Paris last September. Approval of the resolution is expected from the association's council at its meeting in New York.

Science News Letter, May 8, 1948

AGRICULTURE

Seeds Are Sown by Planes

This program gives promise of more meat through creation of larger grazing areas and more lumber by protecting forest sites against erosion.

By RON ROSS

➤ AIR RAIDS over the western United States are helping solve two of the nation's toughest problems: food and housing.

The bombs carried on these peaceful forays are seeds. Bombing seeds on vast areas of the West is an attempt to link the modern air age with the sowing of seeds, one of man's most ancient occupations.

Seeding from the air is standard procedure in some special jobs such as sowing California rice fields. Other large-scale applications of aviation to the farm include dusting crops with new chemical enemies of plant pests. Promising new uses of planes in agriculture are being explored.

Experiments now under way with aerial seeding give promise of fighting both hunger and the shortage of housing.

Increase Meat Production

More meat will be produced on vast grazing areas because of grass seed showered from the air.

More lumber for future homes may come from trees to spring from seeds dropped from planes.

Fighting forest fires from the air is now a common practice. Rangers drop by parachute into a blazing area just as paratroopers descend upon an enemy. The added aerial touch now is the use of airplanes to restore the precious ground cover after a disastrous forest fire.

After the last embers of a blaze have died out and ashes and charred stumps are all that remain of a once valuable forest, the danger is not over. A rain may wash away the unprotected topsoil and keep the site from ever again being a useful forest. The only defense against erosion of the irreplaceable soil is a quick seeding job. This gives the land a protective cover of plants until new trees can be planted and grow big enough to hold the soil, a matter of years.

Planes are now used to drop the seeds of forage plants over the forest ruins, preserving the land for future timber crops. Even if it were possible

to mobilize men and equipment at the frequently remote location of burned forests, a quick rain might wash off priceless soil before a cover could be planted on the ground. But aerial seeding, covering many acres per minute, is saving thousands of acres of future forests.

Trees in some of these forests may spring from seeds dropped by planes.

The ruins of the great forests in Maine which were destroyed in last fall's disastrous fire which wiped out cities, palatial summer homes and a famous cancer research center as well as forests are the testing ground for an experiment which may revolutionize the replanting of forests. In the midst of the timberland swept by the blaze was a large experimental area of the Forest Service of the U. S. Department of Agriculture. Planes rained white pine seed on 2,200 acres of this area in mid-February. If this seeding is successful, it can mean cheaper, faster tree planting on thousands of acres of land each year.

Forest Service scientists will move into the recently-seeded area in a few weeks to make the first survey of their "catch," the young trees which have come up since the aerial sowing in February. More definite results will not be available for as long as five years, until the stand of seedlings has had time to develop into a young forest.

Across the country from the charred forests of Maine, direct seeding of trees from the air has taken on a new twist in the Pacific Northwest. A helicopter, hovering low over the timber-growing hills of northwestern Oregon, rained seed of five different kinds of trees on areas to be reforested.

Helicopter Experiment

The helicopter experiment was conducted by the Crown Zellerbach Corporation, a producer of pulp and paper, last December. In a few hours of flying time, 2,500 acres of land were seeded for trees from the "egg beater." Here, again, foresters will not know the success of the experiment for several years.

Seeding from the air is actually the oldest method of reforesting. In nature,

millions of seeds are scattered. Only a few become trees. If dropping seeds from planes is to be practical, it must be more efficient than Nature, because of the cost of seed.

One way to help use less seed is to fight the rodents such as ground squirrels which will eat the seeds. Poison bait dropped from planes before an area is to be seeded has been used. Another method under experiment is the use of rodent-repellents on the seeds.

Building Future Forests

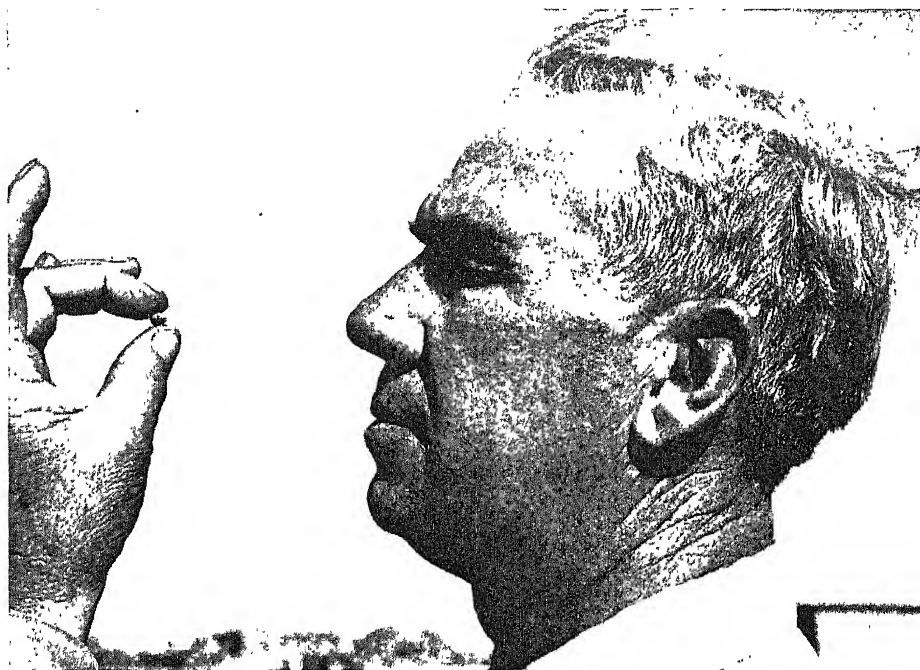
Forest Service scientists declare that planes will play an important role in building future forests. Dropping tree seed from planes is still experimental, but it offers a hope for regaining much of America's depleted forest resources faster and at less cost than any other method.

While planes soar over the forests, helping raise the lumber for tomorrow's homes, another air conquest is being made on dry, near-desert lands of the West. Hundreds of thousands of acres of land have been seeded with grass from the air.

There are millions of acres which might feed more cattle—and put more



AERIAL SEEDING—At a signal from the flagman, the pilot pulls the trigger which releases seeds. The seeds are pellets being dropped over grazing land in Arizona.



DEVELOPED PELLETS MADE OF SOIL—Dr. Lytle S. Adams of Tucson, Ariz., has improved this system of scattering grass seed from the air by using pellets containing seeds, fungicide, insect and rodent repellents, fertilizer and moisture.

meat in your butcher's shop—if grass could be seeded.

Scattering grass seed from the air is called "ordinary broadcasting." The seed is simply dropped. Some of it "catches on" and becomes grass. Much of it does not. Yet this simple method has proved "more than reasonably successful" on more than half a million acres of potential grazing land in experiments directed by Department of Interior scientists.

A method of getting more even seeding with fewer seeds has been developed by a retired dental surgeon in Arizona, Dr. Lytle S. Adams. He uses pellets made of soil. Inside the pellet are seeds,

fungicide, insect and rodent repellents, fertilizer and moisture.

The Department of Interior has spent \$300,000 in the past three years experimenting with Dr. Adams' pellets for aerial seeding. Approximately 146,000 acres have been sown.

Making the pellets and dropping them so that grass will grow have proven difficult problems. First seedings on Indian lands in Arizona were followed by a severe drought. Selection of the proper soil to use in the pellets has been a problem. In some cases seeds began to sprout before they were dropped from the plane.

But the stake in this and other attempts to seed range lands of the West quickly and cheaply is great. Millions of acres of now-idle land might produce millions of pounds of beef for a hungry world. This land must be seeded quickly at the right time and more cheaply than it can be done on the ground.

Air raids which brought death and destruction in the war are now bringing life in seeds for lumber and food.

Science News Letter, May 8, 1948

With a new camera recently patented, snapshots can be taken either in black-and-white or in color simply by turning a knob.

ENGINEERING-AERONAUTICS

Periscopic Sextant Aids Finding Plane's Position

➤ PERISCOPES on airliners, similar to those used on submarines, make it possible for navigators to determine their positions by sextant readings on celestial bodies without the customary viewing bubble projecting above the surface of the plane.

The so-called periscopic sextant, already installed on the Clipper Paul Jones, now flying between New York and Calcutta, has proved satisfactory in a dozen trips across the Atlantic, Pan American World Airways revealed.

The periscopic sextant combines in one delicate instrument the periscope and the bubble sextant. Attached to the ceiling of the flight compartment, it permits the navigator to scan the heavens without the necessity of climbing into an astrodome or viewing bubble. His view of the stars is obtained through a small tube which pokes up a few inches through the metal skin of the plane, and which is so arranged that it can be rotated to give a complete picture.

Another advantage of the periscopic sextant is the lessening of drag on the plane by the elimination of the projecting astrodome. The instrument was developed by the Kollsman Instrument Co., Elmhurst, N. Y., originally for Pan American's version of the Boeing Strato-cruisers, which are now on order.

Science News Letter, May 8, 1948

The unique part of the Mathematics Magazine among mathematical publications is to make expository articles on modern research available to readers who are not specializing in these fields.

In the March-April issue, there appears an expository paper on "The Meaning of Elementary Algebra". This paper presupposes only the fundamental operations of arithmetic. Similar expository papers on the meanings of various classic subjects in mathematics will follow, presupposing, at most, the previous papers of this group.

A subscriber writes,

"I am very interested in the Mathematics Magazine and have read the first copy through very carefully and enjoyably, and am looking forward to doing the same with this one, and eagerly await the arrival of the next one. Best wishes for continued success."

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Do You Know?

Fertilizer in the garden should not be put in contact with seed.

The egg of a grasshopper is small; its shell contains a waxy material.

Rye, whole wheat, barley and corn, in that order, follow oats and rice in nutritional quality of their proteins.

The government has listed some 57 jobs which airplanes are doing in addition to their usual uses; these jobs range from aerial surveys to cattle round-ups.

The importance of soybean in America is evidenced by the fact that production was 20 times as great in 1947 as in 1930; the 1930 crop was 9,000,000 bushels, the 1947 crop was 181,000,000 bushels.

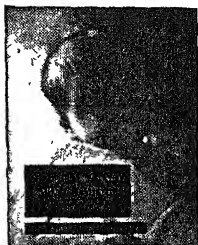
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GENETICS

Gene Is Master Molecule

➤ EVOLUTION of plants, animals and man is controlled by master molecules, which can either build up greater complexity or by dropping out items in an organism's heredity reduce it to greater simplicity ending in parasitic helplessness. These master molecules are the genes, long known as the chemical units that control the hereditary process.

This master-molecule theory of evolution was laid before the meeting of the National Academy of Sciences in Washington by Prof. George W. Beadle of the California Institute of Technology.

A simple organism, by adding gene to gene through succeeding generations, can finally build up a complex of some 10,000 genes, Prof. Beadle stated. The interaction of the genes in so great a complex as this would be sufficient to account for the structural and behavior patterns of the most advanced of plants or animals.

On the other hand, by dropping gene

after gene through many generations, an organism can become so simple, even degenerate, that in the end it is a virus—a living or quasi-living chemical something that can hardly claim the name of organism. If a virus is not a gene that has lost all powers except that of living at some other being's expense, it at least has a close resemblance to a lone, lost gene.

Prof. Beadle was started on his new outlook on the evolutionary process through his researches on the genetics of the mold-fungus *Neurospora*, which have already attracted wide attention. He has succeeded in keeping alive strains of this fungus that have taken the first step towards that ultimate simplification that is just short of annihilation, by supplying them with certain protein-building molecules known as amino-acids, which they have lost the power of producing for themselves, through the dropping out of genes.

Science News Letter, May 8, 1948

PHOTOGRAPHY

New Fast X-Ray Movies

➤ SUPER-SPEED X-ray movies which take pictures faster than you can blink an eye were shown the American Physical Society meeting in Washington.

Dr. Charles H. Slack, director of research for the Westinghouse Lamp Division, said some of the possible uses of the new X-ray movies include:

Visible evidence of the fastest-moving organs within the body for study by doctors.

X-ray movies of persons walking and running to aid orthopedists, chiropractors and shoe manufacturers.

Pictures of the burning action of fuel in a rocket.

Solving the industrial mysteries of how metal is deposited from an arc welding rod and how molten metal flows into a casting mold.

The physicists were shown a 15-second movie of what happens when a violent chemical reaction takes place. The super-speed X-ray film revealed details of the complex reaction.

X-ray exposures of ten millionths of a second are teamed with a shutterless camera shooting movies at 100 frames a second in the new equipment. Movies at 150 frames a second have been made,

and Dr. Slack said that 2,000 frames per second may be possible.

With more powerful X-ray tubes, he predicted that car and airplane engines can be inspected from the outside while they are running. This could lead to smoother, safer engine performance.

Super-speed X-ray movies were developed at the Westinghouse Lamp Research Laboratories, Bloomfield, N. J., under contract with the Department of the Navy's Bureau of Ordnance.

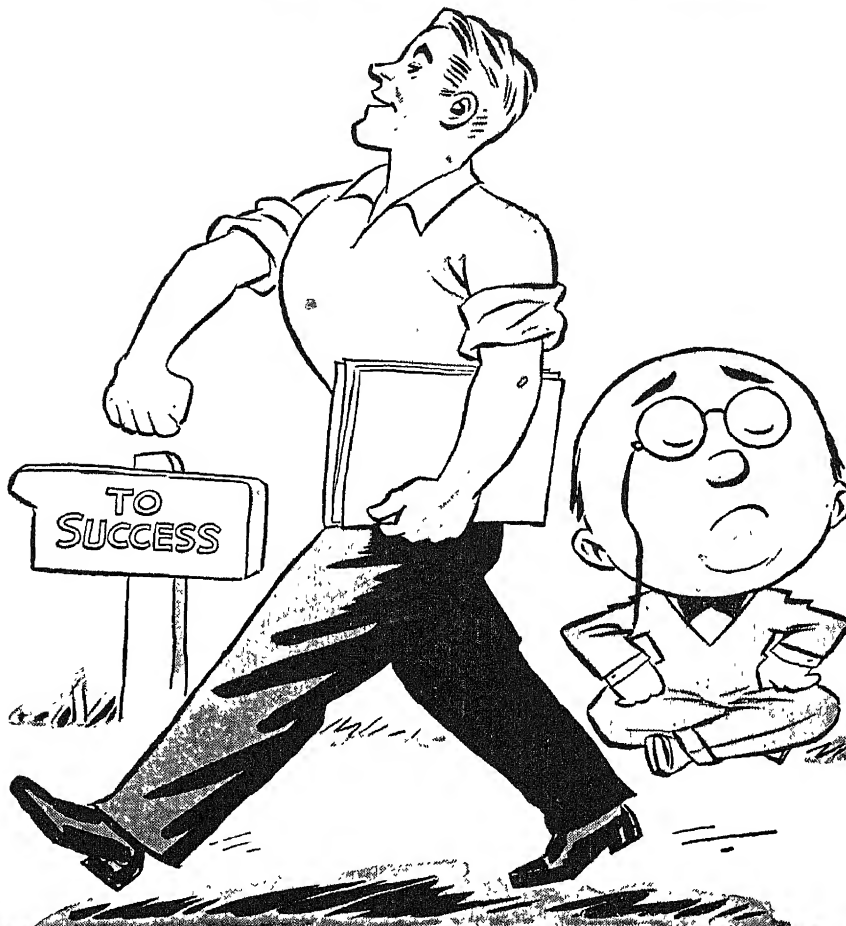
Science News Letter, May 8, 1948

Science Service Radio

➤ LISTEN in to a discussion on "Psychology—Yesterday and Tomorrow" on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p.m. EDT Saturday, May 15. Dr. Walter Bingham, one of the country's leading psychologists, chairman of the Council Advisory to the Director of Personnel, U. S. Army General Staff, will be the guest of Watson Davis, director of Science Service. Dr. Bingham will tell about the many areas of human problems being aided by psychological methods today.

Science News Letter, May 8, 1948

How to pass a genius



All of us can't be geniuses. But any ordinarily talented mortal can be a success—and that's more than some geniuses are.

Now, as in Æsop's time, the race doesn't always go to the one who potentially is the swiftest. The *trained* man has no trouble in passing the genius who hasn't improved his talents.

In good times and bad times, in every technical and business field, the *trained* man is worth a dozen untrained ones, no matter how gifted.

The International Correspondence Schools can't make you into a genius. For more than 56 years, however, I. C. S. has been helping its students to become *trained, successful leaders*—and it can do the same for you.

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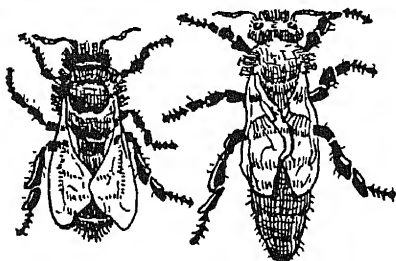
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Bees' Business

➤ **BEE'S** business is usually measured only in terms of honey production. If that were all bees did for man it would be enough to justify their keep, for the annual production of honey in this country is estimated at 200 million pounds—which is equal to the displacement of a first-class cruiser. At present honey prices, that's really "heavy sugar". And there is also a tidy sideline of beeswax, still an important item in many industries and arts.

But bees work for us in a hundred other ways: our tables would be terribly impoverished if they were to disappear for even one season. The pollinating activity of bees is required for practically all our fruit trees and berry bushes, our melons, squashes, pumpkins and cucumbers, our tomatoes, eggplant and peppers, for the cotton we wear and the tobacco we smoke.

True, some of the plodding staples of our diet need no help from the bees. Potatoes, both white and sweet, are propagated without recourse to seed. The grains and the hay and pasture grasses are wind-pollinated. Buckwheat, however, is commonly rated as a cereal even though it is not a grain, and it requires the services of honey bees to make a crop.



WYOMING

Ride, fish, geologize or just relax. How?

Paton Ranch will give you trout fishing in a mountain stream as it flows out of a canyon in the Big Horn Mountains, daily horseback rides along the picturesque trails and excellent food—most of which is grown on the ranch.

The region abounds in geological and historical interest—dinosaur bones, marine fossils and Indian implements are found nearby.

Write for folder—Paton Ranch, Shell, Wyoming.

It would really seem more appropriate to anoint our buckwheat cakes with strained honey than with the traditional maple syrup.

Alfalfa, sweet clover and several other clover species, all of which figure importantly in the production of meat and dairy products, need the visits of bees to insure seed for the next sowings. Seedsmen would be hard put to produce seeds for flower and vegetable gardens in a beeless country.

Bees are important to a number of our forest and ornamental trees, though it is true that a majority of our trees are wind-pollinated. Among the bee-visited trees are the locusts, the magnolias, tulip-tree, flowering dogwood, sassafras and sourwood. Of all varieties of honey, the

honey of the sourwood tree of the Southeast is, in the opinion of many, the most fragrant.

It is no fancy that honey takes on something of the characteristic fragrance of the flowers from which it is produced. When there is a great abundance of flowers of one particular kind in bloom, as in a clover field or an apple orchard, the bees in the vicinity will work on those flowers almost exclusively. If a bee gets started on one kind of flower at the beginning of the day, she will work only on that kind all day long. The result is that the combs are loaded with honey concentrated mainly from the flowers predominant at a given time in the neighborhood.

Science News Letter, May 8, 1948

Books of the Week

TO SERVE YOU: To get books, send us a check or money order to cover retail price. Address Book Dept., SCIENCE NEWS LETTER, 1719 N. St., N. W., Washington 6, D. C. In the case of free publications order direct from issuing organization.

ABBOTT LAWRENCE LOWELL, 1856-1943—Henry Aaron Yeomans—*Harvard University Press*, 564 p., illus., \$6.00. The biography of Lowell is also, naturally, a history of Harvard University.

AMERICAN JUNIOR COLLEGES—Jesse P. Bogue, Ed.—*American Council on Education*, 2d ed., 537 p., \$6.50. A very useful and comprehensive directory.

APPLIED PHYSICS: ELECTRONICS, OPTICS, METALLURGY—*Little, Brown*, 456 p., illus., \$6.00. A history of four divisions of the Office of Scientific Research and Development.

ATOMIC ENERGY, ITS INTERNATIONAL IMPLICATIONS: A Discussion by a Chatham House Study Group—*Royal Institute of International Affairs*, 128 p., paper, \$1.25. By a group of men prominent in British political and scientific life.

CARNEGIE INSTITUTION OF WASHINGTON YEAR BOOK No. 46, July 1, 1946-June 30, 1947—*Carnegie Institution of Washington*, 211 p., illus., paper \$1.00, cloth \$1.50. Reports of investigations in many fields.

DEVELOPMENT AND GROWTH OF THE RATTLE OF THE RATTLESNAKES—Arnold A. Zimmermann and Clifford H. Pope—*Chicago Natural History Museum*, 58 p., illus., paper, 75 cents. The gross studies were supplemented by X-rays of the live snakes.

THE DIGESTIVE TRACT IN ROENTGENOLOGY—Jacob Buckstein—*Lippincott*, 889 p., illus., \$16.00. This profusely illustrated volume will serve not only the roentgenologist but also the surgeon and physician as an aid to diagnosis.

FARMERS OF FORTY CENTURIES: Or Permanent Agriculture in China, Korea and Japan—F. H. King—*Organic Gardening Press (Rodale)*, 379 p., illus., \$5.00. First American edition of a book originally published in England and already familiar to many American readers.

FUNDAMENTALS OF HUMAN REPRODUCTION—Edith L. Potter—*McGraw-Hill*, 231 p., illus., \$3.50. Although intended especially for nurses, this book is written in non-technical language so that it can be read by all those with an interest in how we all began.

HOLLYWOOD ON TRIAL: The story of the 10 Who Were Indicted—Gordon Kahn—*Boni & Gaer*, 229 p., paper, \$1.00, cloth \$2.75. Has a foreword by Thomas Mann. Because the Un-American Activities Committee is also under indictment by many scientists for the Condon affair, this is a timely book for scientists.

INTRODUCTION TO THE DIFFERENTIAL EQUATIONS OF PHYSICS—L. Hopf—*Dover*, 154 p., \$1.95. A book for home study intended for physicist and engineer.

MEDICINE IN THE POSTWAR WORLD: The March of Medicine, 1947—*Columbia University Press*, 109 p., \$2.00. A group of lectures including discussion of the effect of atomic research on medicine and the new antibiotics.

THE ROCKEFELLER FOUNDATION: A Review for 1947—Raymond B. Fosdick—*Rockefeller Foundation*, 64 p., illus., paper, free from the publisher, 49 West 49th St., New York City. An account of the world-wide activities of this institution.

ROSES FOR EVERY GARDEN—R. C. Allen—*Barrows*, 218 p., illus., \$3.50. A book for gardeners on America's favorite flower.

THE SOLAR SPECTRUM, Lambda 6600 to 13495—Harold D. Babcock and Charlotte E. Moore—*Carnegie Institution of Washington*, 95 p., paper, \$1.40, cloth \$2.00. Results accumulated since 1925 are tabulated for about 7400 spectral lines.

THEORY OF HARMONY: Harmonielehre—Arnold Schoenberg—*Philosophical Library*, 336 p., illus., \$7.50. A translation by Robert D. W. Adams of a work by a Viennese musician.

Science News Letter, May 8, 1948



Department store demonstrations show how television makes shopping easier—saves time!

Shopping by Television—a coming convenience

You know television as an exciting source of news and entertainment. But what about its many other uses?

250,000 people—at a demonstration arranged by RCA Victor—learned the advantages of a “Shop-by-Television” program. Television receivers, conveniently located throughout a big store, showed customers what was going on in other departments . . . saved time . . . made shopping simpler.

88% of these customers said television was a major help . . . 62% said the program had drawn them to the store . . . more than half intended to visit departments where televised merchandise was sold. Sales of many televised items jumped 200% above normal!

Beyond its value *within* a store, “Shop-by-Television” is already reaching across the air waves to enter customers’ homes. How convenient it will be to *see* merchandise on the screen of your RCA Victor television receiver, and then

be able to do much of your shopping by telephone!

Such types of progressive research lead to new uses for radio-electronic products and services, and to the quality you associate with the names RCA, and RCA Victor.

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When in Radio City, New York, be sure to see the radio, television and electronic wonders at RCA Exhibition Hall, 36 West 49th Street. Free admission. *Radio Corporation of America, RCA Building, Radio City, N. Y. 20.*



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New Machines and Gadgets

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 413. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

⚙️ **TABLE WARMER**, to keep food hot on the dining table, is a plastic base topped with a chromed metal grate which contains a smoke-proof, smudge-proof candle that burns six hours. The base easily accommodates any dish, pan or plate normally used in the home.

Science News Letter, May 8, 1948

⚙️ **FLUORESCENT LAMP** with the familiar color of incandescent bulbs is designed especially for use in homes and retail stores. It is claimed to have an increased efficiency of approximately 7% over corresponding wattage of standard white fluorescent lamps.

Science News Letter, May 8, 1948

⚙️ **COTTON COVER** with a mop fringe at its bottom fits over the straw of any household broom and converts it into a dusting mop for walls and ceilings. The washable bag-like cover is quickly snapped in place, and can be as easily removed.

Science News Letter, May 8, 1948

⚙️ **TRACTION PAD**, for use in starting an automobile on ice, is a small flat paper bag of sand with a tab of sandpaper or emery cloth stitched to one end. Placed in front of the wheel with the abrasive tab as far under it as possible, it is drawn under by the rotation of the wheel and the bag of sand is broken.

Science News Letter, May 8, 1948

⚙️ **VACUUM CLEANER**, shown in



the picture, comes with attachments for cleaning out-of-the-way places, and also attachments to permit its use in spraying insecticides, or liquid wax on wood-work or flooring. It has no dirty bag to empty; the gatherings are just poured out of a metal dust bowl.

Science News Letter, May 8, 1948

⚙️ **FISH LURE**, the shape and size of a minnow, contains a tiny battery, electric motor, and water-jet propulsion which gives it relatively slow motion. Imitation frogs and ducks with the same propulsion equipment are toys for children.

Science News Letter, May 8, 1948

⚙️ **CRIB ATTACHMENT**, a combination toy and exerciser for the baby that is fastened from side to side of the rails, has an upright animated figure, such as a chicken, with cords attached for the youngster to grasp. By pulling a cord, the figure is turned around on a pivot.

Science News Letter, May 8, 1948

⚙️ **AIR CUSHION** pad for gunstocks, recently patented, fits on the butt between it and the shoulder and eases the "kick" on the body when the gun is fired. It is the shape and size of the shoulder end of the gun and is held in place by a resilient boot that fits snugly the sides of the stock.

Science News Letter, May 8, 1948

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Emperors Hold Court

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MEDICINE

Two Kinds of Jaundice

One virus, called IH, causes infectious hepatitis and the other virus, SH, causes homologous serum hepatitis. Each is contracted in a different way.

➤ A MYSTERY about yellow jaundice, skin-coloring and liver-attacking disease of fighting men and children alike, has been solved by the discovery that there are actually two kinds of the disease.

Two kinds of virus, one IH (infectious hepatitis) and the other SH (homologous serum hepatitis), were announced and described to the International Congress on Tropical Medicine and Malaria meeting in Washington by Dr. John R. Nefee found from his studies with human volunteers. Getting IH hepatitis, however, does not protect against an attack of SH hepatitis, nor does an attack of SH protect against IH.

Jaundice worried the Army greatly during the early days of the war when it attacked large numbers of our troops who had been vaccinated against yellow fever. The worst worry, that the men had gotten yellow fever from the vaccine, was soon relieved. It was not yellow fever and the stuff in the vaccine that gave them the jaundice was eliminated from further batches of vaccine.

But jaundice continued to take a serious toll among the armed services of many nations during the war. It broke out in a summer camp for boys and girls in Pennsylvania after the war. It had plagued civilian populations for years. The puzzles of what it was and how you got it and how to stop it continued.

The jaundice itself, which is the yellow color of skin and eye whites, is only a symptom. The underlying condition is a liver inflammation, called hepatitis.

With the discovery that there are two viruses, each causing a different kind of jaundice, the puzzles are partly solved. One virus, called IH, causes infectious hepatitis. This jaundice sickness starts within 15 to 37 days after the virus gets into the body. It develops suddenly, with fever and other sharp clinical signs before laboratory tests show the presence of the infection.

The other virus is called SH. The jaundice it causes is named homologous serum hepatitis. This disease does not develop until 60 to 135 days after the virus has gotten into the body. And when it does develop, it comes on slowly, without fever, and laboratory signs come before the symptoms of the disease.

Both viruses cause hepatitis when injected into the body. But only virus IH causes disease when it gets into the body by the mouth, being swallowed in food or water. Immune serum protected against virus IH but not against virus SH, Dr. Nefee found from his studies with human volunteers. Getting IH hepatitis, however, does not protect against an attack of SH hepatitis, nor does an attack of SH protect against IH.

Once started, an attack of IH hepatitis is much like one of SH. This had led doctors to think they were dealing with just one disease. But it was hard to see how a disease that could break out in an epidemic in a children's camp could also attack a grown-up thousands of

PUBLIC HEALTH

Battle Alcoholic Problem

➤ A "HANDS across the continent venture" for battling the problems of alcohol will get started this summer when the Yale Institute of Alcohol Studies in the Southwest is established.

The joint attack by Connecticut and Texas educational and scientific leaders was formally inaugurated at a two-day celebration at Fort Worth, Texas, May 14 and 15.

Plans for the establishment by Yale University of a large, long-range research and clinical center in cooperation with Texas Christian University were announced by Dr. Howard W. Haggard, director of the Yale Laboratory of Applied Physiology.

As now planned, the Yale Institute of Alcohol Studies in the Southwest will comprise the following activities:

1. A research unit in the social sciences at Texas Christian University.
 2. A clinic for the rehabilitation of alcoholics at Dallas.
 3. A summer school of Alcohol Studies at Trinity University, San Antonio. This will be patterned after the nationally famous summer school conducted each year in New Haven by Yale.
 4. Informal educational activities, at all levels, throughout the state.
- The clinic in Dallas, Texas, under the

miles away who had never had any contact with any jaundice patient. The answer, Dr. Nefee's studies show, is that the children had one kind of hepatitis, and the grown-up had a different kind caused by a different virus and contracted in a different way.

The IH disease apparently can be spread like typhoid fever, from food, milk, water or other things sometimes put in the mouth such as pencils, if they are contaminated with the virus.

Since both viruses get into the blood of the patient, they might be spread by biting insects. No evidence that they are, however, has yet been discovered.

Dr. Nefee cautioned against the dangers of transmitting both these diseases in injections involving transfer of blood or its products from person to person. He pointed out also the risk of using improperly sterilized needles or syringes as a source of infection. Hepatitis viruses have survived heating to 56 degrees Centigrade (138 degrees Fahrenheit) for periods of 30 to 60 minutes.

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direction of a psychiatrist who has specialized in the treatment of alcoholism, will conduct research on physiological sensitivity to alcohol, psychological factors contributing to alcoholism, preventive mental hygiene and tests of new methods of treatments. All work will be carried out in cooperation with medical institutions which will receive grants from the Yale Institute.

The clinic will maintain in-patient and out-patient services, will accept referrals from all sources and will offer its services particularly to the police courts in order to replace admittedly useless penal methods by clinical treatment. It will seek to use all community resources in the care and treatment of alcoholics. One of its most important functions will be the training of clinical personnel to meet the great demand for specialists.

The research unit in the social sciences will consider: methods of alcohol education in schools; investigation of social, economic, educational and religious factors which may be used in the prevention of inebriety; determination of the extent and intensity and nature of alcoholism in Texas and the Southwest in various age groups, occupations, rural and urban areas; a survey of the effectiveness of liquor control laws.

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ARCHAEOLOGY

Double Double-Cross

This modernly flavored bit of political connivance took place some 2500 years ago in Greece. The word "ostracism" comes from the peculiar ballots used.

➤ HERE is the story of a political double double-cross, that happened in a certain town. After you have read it, you may figure out whether it might possibly have been your town.

Three men were contending for recognition as top boss. Let us identify them, for the moment, by nicknames. First there was "Bolo," considered pretty much a left-winger; a man of working-class origin, strong for the labor vote. Opposing him was "Al," an ambitious, up-and-coming young fellow, but rated as reasonably safe by the solid-businessman element. Between them was a veteran officer, "Nicky," expected to catch a considerable ex-GI vote.

An election was coming up, in which all three would figure. The deal was that the one who came out at the bottom of the heap would have to leave town and stay away for ten years.

Al first turned his guns on Nicky. That looked like a signal for Nicky and Bolo to gang up against him. Realizing this in time, and not relishing the idea

of having to spend his best ten years out of politics, Al switched, supported Nicky whom he had at first attacked, and so sent Bolo into exile.

All this happened in Athens. Not Athens, Ga., or Athens, Ohio, but Athens, Greece. And for all the modern flavor of the skulduggery it happened nearly 2500 years ago, in 417 B.C., when Hyperbolos the demagog got the short end of an ostracism election in which the other "candidates" were Nikias, a popular general, and Alcibiades, about the smoothest politician that Greece ever produced.

The story is told in the journal, *Archaeology* (Summer, 1948), by Antony E. Raubitschek, along with some interesting tales of other ostracisms conducted in ancient Athens.

That interesting political device, by which the citizens could pick out one of their number and exile him for ten years, seems to have been the one real chance that they have ever had to indulge the very human impulse to "vote

against" someone, without having to vote in favor of someone else whom they didn't like, either. You simply put on your ballot the name against which you had the biggest gripe, and if enough of your neighbors did the same thing, out he went.

The ten-year sentence of exile was softened by the possibility of a recall by vote of the Athenian Assembly, or town council. And whether he served out his full ten years or was recalled sooner, the loser retained his citizenship and title to his property. Some of Athens' most noted leaders suffered ostracism, and were subsequently recalled to lead the state anew.

Ostracism gets its name from the peculiar ballots used. Voters scratched the names of the "candidate" on bits of broken pottery, which were known as "ostraka." Originally, ostraka were oyster-shells, and the name apparently was transferred to the pottery scraps because of a general resemblance in size and texture.

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MEDICINE

Hibernation of Germs Affects Malaria Relapses

➤ HIBERNATION plays a part in the time interval between relapses of malaria, Drs. G. Robert Coatney and W. Clark Cooper of the National Institute of Health told the Congress on Tropical Medicine and Malaria meeting in Washington.

The hibernating is done by the malaria germs, or parasites as doctors call them. This hibernation seems to be the reason why there is a long, over-winter period between a first attack of malaria and the first relapse in patients who get malaria in the United States. It may also be the reason for the spring wave of malaria in other temperate-zone regions.

Malaria germs from the tropics, however, such as attacked our fighting forces in the South Pacific, do not seem to hibernate. Relapses come in close succession, as many a veteran knows.

Drs. Coatney and Cooper had a unique chance to compare malaria parasites in the course of the war search for a quinine substitute for malaria treatment. Human volunteers were used in one stage of the studies. By 1944 the doctors had germs of vivax malaria from the blood of a soldier recently returned from New Guinea. They belonged to the Chesson strain of malaria germs. The doctors were able to infect some human volunteers with these germs and infect other



AN OSTRAKON—Sometimes called a potsherd ballot, it was used in the voting that sent into exile one of Athens' foremost citizens. It bears his name, in crudely scratched characters: Aristeides, son of Lysimachos. This could be the very ballot which one grouchy Greek cast because, he said, he was "tired of hearing Aristeides called 'the Just'."

volunteers, living side by side under identical conditions, with germs of the St. Elizabeth vivax malaria strain. These were isolated in the United States.

The St. Elizabeth strain caused a first attack within a few weeks after the volunteers were bitten by infected mosquitoes. But the relapse did not come

until six to 12 months later. The Chesson strain caused relapses one right after the other.

The doctors do not think the Chesson strain will adapt to our temperate-zone climate and abandon its tropical habit of developing rapidly in the body.

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MEDICINE

High Blood Pressure Aids

Adding salt to the food and injecting an anti-blood clotting chemical in patients with this kind of disease appears to bring improvement.

➤ MORE salt in the diet and an anti-blood clotting chemical are two new weapons for fighting high blood pressure. They were discussed at the meeting of the American Foundation for High Blood Pressure in Cleveland.

More salt in their food is the pleasant prospect for patients with the kind of high blood pressure doctors call malignant hypertension and kidney disease. The present trend of restricting salt rigidly in such cases has gone too far, in the opinion of Dr. Francis D. Murphy of Marquette University School of Medicine. He reported that many patients are doing better when salt is added to their food, rather than restricted.

The anti-clotting chemical, heparin, is being tried cautiously in women who develop high blood pressure during pregnancy. This is the forerunner of dangerous convulsions. The ancient Greeks seeing a pregnant woman seized with a sudden fit thought it was due to a lightning thrust from heaven and gave it the name of eclampsia, meaning, "a bolt from the blue."

The condition remains a mystery, although modern doctors can detect the early stage of the disease by watching the pregnant woman's blood pressure. When it goes up, the patient is usually promptly put to bed. What to do next has remained a problem because the cause of the condition is not known.

It is known, however, that the blood of women with this condition clots more quickly. The red blood cells tend to stick together and the small blood spaces in the liver and placenta seem to be blocked by clotting fibers.

This has led to the trial of the anti-clotting chemical, heparin. When this is injected for several days into the veins of women in the pre-eclampsia stage, many of the serious symptoms seem to improve, Dr. E. W. Page of the

University of California Medical School reported.

The improvement lasts as long as the drug is given. But the drug seldom cures the condition completely for the blood pressure often remains high.

The new treatment, Dr. Page pointed out, has certain drawbacks. It is expensive. The patient requires constant attention day and night. And it is dangerous, although no harmful effects have been noted so far.

Dr. Page and other scientists consider it merely a step toward development of a simpler, less costly treatment which will produce the same good results.

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PSYCHOLOGY

Color of Skin Doesn't Affect Color Vision

➤ THE color of a person's skin has nothing to do with the acuteness of his color vision, it is indicated by a study made by Dr. R. W. Pickford, of the psychology department of the University at Glasgow, Scotland. His race may have.

Tests on 571 men and women normally sensitive to color and 138 colorblind persons, reported in the scientific journal, *Nature* (May 1), show that red and green are mixed up by dark people just as much as by the fair but no more often.

These results are in conflict with the earlier finding that red-green blindness is more common in the south and west of the British Isles where the original dark-skinned inhabitants were pushed back in the days when the blond Nordics invaded. Earlier studies had also shown that red-green blindness is less common among American Indians and American Negroes than among American whites.

It may be racial difference rather than the difference in color that is related to

differences in color vision, Dr. Pickford suggests.

To check on this, he tested 20 members of dark-skinned races. Still he found no difference in ability to see and distinguish red and green. They are, however, less sensitive to blue and yellow.

Nine of the group are Dravidians, a people from India. These people were found to be less sensitive to yellow and blue than the Europeans tested. Six West Africans were even less sensitive than the Dravidians.

Negroes and American Indians, it seems, have better red-green color vision than Europeans, but Dravidians and Negroes are more often weak in vision of yellow and blue.

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ASTRONOMY-RADIO

Moon Affects Reception

Shortly after a new or full moon the band of frequencies usable for shortwave radio broadcasts is narrowed slightly in some parts of the world.

➤ NOT just the sun, but also the moon affects reception of shortwave radio broadcasts.

Three or four days after the moon is new or full, the band of frequencies that can be used to get shortwave broadcasts through to distant stations is slightly narrower in some parts of the world than at other times.

At Huancayo, Peru, where the effect is quite pronounced, the usable frequencies at noon from November to February averaged 1.7 megacycles lower three or four days after new and full moons than after the quarters of the moon. This was reported by Dr. A. G. McNish of the National Bureau of Standards at the joint meeting in Washington of the International Scientific Radio Union, American Section, and Institute of Radio Engineers.

Just as the moon raises tides in the ocean, so it produces tides in the atmosphere. That portion of the earth's atmosphere facing the moon is actually pulled toward the moon, and the earth in turn is pulled away from the atmosphere on the opposite side. Thus the atmosphere bulges out at these two regions.

This football effect also works on the ionosphere, series of invisible layers 50 to 250 miles above sea level that bounces radio waves back to the earth and en-

ables us to hear distant broadcasts. But this direct tidal effect alone does not adequately explain the low critical frequencies, Dr. McNish pointed out. Such an explanation has been advanced by D. F. Martyn of Australia who last year independently reported that critical frequencies vary with the phases of the moon.

As an alternate explanation Dr. McNish and T. N. Gautier, also of the National Bureau of Standards, suggest that the variations are due to magnetic fields which are known to be set up within the atmosphere by the lunar variations.

Solar radiation ionizes the atmosphere on the sunlit side of the earth by knocking electrons out of atoms. Currents can flow in this ionized atmosphere. The magnetic field of these currents modifies slightly the earth's magnetic field. These resulting currents are further modified by the tidal action of the moon.

These currents affect the ionized layer of the earth, and tend to decrease its density. When the ionization is reduced, the highest frequency that can be used to get broadcasts through to distant countries is lowered. This critical frequency has been found to be a megacycle or two lower than it would be were the near-by moon not affecting the ionized layers.

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farther from the earth without an appreciable increase in the height of the bottom of the layer.

This mattress of atoms with the electrons knocked out of them is twice as thick in the early morning during sunspot maximum as during periods of little activity on the sun. It becomes three times as thick during the middle of the day.

At sunspot maximum the highest frequency which is reflected from the radio roof at any instant when the signals are sent directly skyward is much higher than at other times. It has always been expected, Mr. Peavey said, that the highest usable frequency would increase along with an increase in critical frequency. While this is true a big proportion of the time, there are outstanding exceptions.

At certain hours for certain locations the maximum usable frequency will not be appreciably greater than at sunspot minimum. The point at which the signal is reflected largely determines just when these exceptions will occur.

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ASTRONOMY-RADIO

Radio Signals Go Farther

➤ SHORTWAVE radio broadcasts go much farther with only one reflection from the earth's radio roof when the sun's disk is marred with many sunspots than during sunspot minimum.

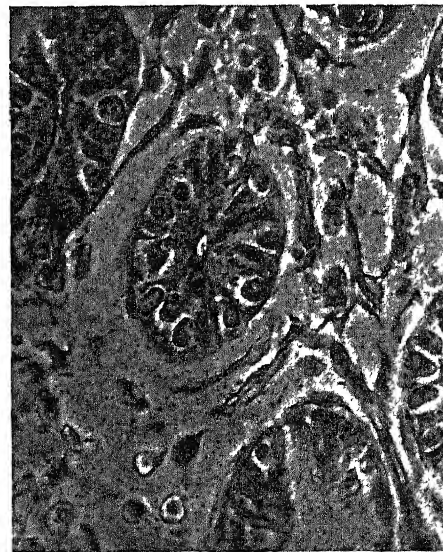
This is because the reflecting layer is much higher during sunspot maximum, R. C. Peavey of the National Bureau of Standards stated at the joint meeting of the International Scientific Radio Union, American Section, and the Institute of Radio Engineers in Washington.

The point of reflection is higher throughout the entire day, Mr. Peavey and Miss Gladys R. White, also of the Bureau, have found. From the middle

of the afternoon through the evening, it is as much as 125 miles higher than during sunspot minimum.

In the past it has been assumed that radio signals during a single hop go a maximum distance of 2,500 miles. But when there is much activity on the sun, a single-hop transmission may be 800 miles more than this. Signals being reflected only once have been estimated to travel as far as 3,300 miles.

The whole radio roof, layer of ionized particles that return radio signals to the earth, is much thicker during sunspot maximum, Mr. Peavey reported. The thickest part of the ionized layer moves



DELICATE CELL STRUCTURE—
Details of liver tissue photographed in a fresh unstained condition are revealed by the phase microscope. (See SNL, May 8). They are invisible under the ordinary microscope. This instrument is expected to reveal much about important life processes. The picture was taken at the Carnegie Institution Department of Johns Hopkins Medical School.

MEDICINE

One Out of Three Saved

➤ ONE person in three who would be expected to die from a specific heart attack can be saved by intelligent use of two new drugs, Dr. Irving S. Wright of New York declared at the meeting of the Illinois State Medical Society in Chicago.

The one out of three to be saved would be a victim of a blocking of the artery supplying the heart muscle with blood. Coronary occlusion is the medical name for the condition. When the blocking is caused by a blood clot, doctors call it coronary thrombosis.

The drugs that would save him are anti-clotting chemicals. They are called heparin and dicumarol. Heparin is extracted from the liver. Dicumarol is found in spoiled sweet clover but is also made synthetically.

These drugs were used in a study of 1,000 patients at 17 hospitals throughout the United States. The study was set up in 1946 under the auspices of the American Heart Association and financed by the U. S. Public Health Service.

"During the past 20 months patients admitted to the participating cardiac (heart) services on even days of the months have received conventional treatment while those admitted on odd days of the months have received conventional plus anticoagulant (anti-clotting) treatment," Dr. Wright explained.

The results to date show that the number of deaths from coronary thrombosis can be reduced from approximately 23% to 13%, or between one-third and

one-half. The number of thromboembolic complications can be reduced from approximately 19% to 9%, or one-half, by the proper use of anticoagulant treatment, Dr. Wright reported.

Patients with rheumatic heart disease who suffer multiple attacks of blood vessel blocking by blood clots are likely also to be helped by the anti-clotting drugs. Twenty-two such patients have been given the new treatment since 1946.

Some who have had as many as 12 and even 20 blood clots have stopped having them, Dr. Wright reported. In the six treated more than one year, one for as long as 19 months, no blood clots have developed.

The new method has some disadvantages, Dr. Wright pointed out. It is difficult to keep patients faithful to the treatment regime over long periods when they are not in the hospital. And the drugs themselves are not ideal. Most of the so-called failures with them, however, come from failure to give enough of the drugs, he said.

The possibility of using these or a still-to-be-discovered ideal anti-clotting drug as a preventive of some forms of heart trouble was discussed by Dr. Wright.

"The fact that an extremely high percentage of persons in the older age group die or are crippled by thrombotic episodes raises interesting questions regarding the widespread prophylactic use of such a drug, first suggested by E. V. Allen," he concluded.

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MEDICINE

Give Pint of Blood Yearly

➤ EVEN in peacetime America must give 3,700,000 pints of blood each year, Admiral Ross T. McIntire, administrator of the American Red Cross National Blood Program, told members of the pharmaceutical profession meeting in Washington.

An offer to help achieve this goal was made by the American Pharmaceutical Association during ceremonies dedicating a war memorial to pharmacists.

The 3,700,000 pint figure is the blood physicians and surgeons estimate the nation needs each year to save the lives of accident victims, mothers in childbirth, sufferers from hemorrhage due to other causes and sick people who can be

helped to recovery through use of various components of blood. More than 50 such components have been discovered and many of them are medically useful, Admiral McIntire said.

To meet the blood needs, at least one out of every 20 persons between the ages of 21 and 59 must give a pint a year. The first six of an eventual nationwide network of Red Cross blood centers for collecting and distributing blood have already been established. The blood collected through this program and its products will be supplied without charge where needed.

"Preparedness," or "civilian defense planning" may constitute a "moral

equivalent of war," Dr. Leonard A. Scheele, Surgeon General of the U. S. Public Health Service, declared at the health conference on national security held in conjunction with the war memorial dedication.

What such planning or preparedness amounts to, he said, is "building a strong peacetime public health program through the cooperation and team work of all groups concerned with health.

"It is our best guarantee of national happiness and prosperity."

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GENERAL SCIENCE

Memorial Fund Established For Students of Science

➤ A MEMORIAL fund, the income of which will be used to "reward and help young students of science," is being established at Princeton University in memory of the late Shuichi Kusaka, internationally known Japanese-born physicist and a member of the Princeton Faculty, who was drowned last August at Beach Haven, N. J., it was announced by Dr. Harold Willis Dodds, president of Princeton.

Several distinguished scientists including Dr. Albert Einstein, Dr. J. Robert Oppenheimer, director of the Institute for Advanced Study, and Prof. Henry D. Smyth, chairman of Princeton's Department of Physics, are among the members of the committee sponsoring the project that has already gained the support of Japanese-Canadians in Vancouver, British Columbia, where Dr. Kusaka made his home before World War II.

Born in Osaka, Japan, Dr. Kusaka moved to British Columbia when he was five years old and was graduated from the University of British Columbia in 1937 with highest honors in mathematics and physics. He took his Master in Science at the Massachusetts Institute of Technology in 1938 and in 1942 was granted his doctorate in theoretical physics by the University of California.

He became a member of the Institute for Advanced Study in 1942. A year later he joined the Smith College faculty and, following two years of enlisted service with the Army of the United States at the Research Laboratory at the Aberdeen Proving Ground, Md., became a member of Princeton's Department of Physics. Shortly before his death last summer he was promoted to an assistant professorship at age 31.

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MEDICINE

Hormones Check Aging?

What may be an anti-aging effect on the body, an increase in the size and weight of vital organs, was noted after giving various combinations of hormones.

➤ THE mythical fountain of youth is to be found, if at all, in properly balanced doses of all the main hormones produced by the body's glands.

This suggestion comes from the latest report of a scientific search for an anti-old age chemical or combination of them. The search is being carried on by Dr. V. Korenchevsky of the Gerontological Research Unit at Oxford University.

"Some processes of aging can be influenced arbitrarily," he reports to the *British Medical Journal* (April 17).

But it is only some processes which his studies thus far show can be influenced, he stresses.

Male and female sex hormones and thyroid hormone were tested for their effects on aging in female rats. The rats were artificially aged, or made into old lady rats, by having their ovaries removed. The hormones were given alone and in various combinations. The effects were determined by comparing the size and structure of vital organs, such as the adrenal glands, liver, thyroid gland, kidneys, spleen and heart, in the treated animals with the same organs in normal animals and in artificially aged animals that were not treated.

All the hormones had a stimulating and in some cases a simultaneously depressing effect on various organs.

The stimulating effect was shown by an increase in size and weight of the organs. Dr. Korenchevsky thinks this is a sign of an anti-aging effect because decrease in size and weight should be the first sign, at least in some organs, of the shrivelling they do in growing old.

The organs of the artificially-made old lady rats came nearest to the size and structure of the normal young lady rats when all four hormones (male, two female and thyroid) were given simultaneously in suitable, not excessive, doses.

"In this way," Dr. Korenchevsky reports, "a cooperation of useful effects and more or less complete neutralization of pathologic (injurious) effects occurred."

Harmful effects on some organs did occur when large doses of one or another of the hormones were given.

The results, Dr. Korenchevsky points out, do not warrant any definite conclusion as to whether the increase in size of the organs is, as it appears to

PSYCHOLOGY

Trance Slows Down Time

➤ TIME can be slowed so that incredible tasks can be accomplished in the mind—in the course of only a few seconds.

This is done by suggestion during a hypnotic trance, Dr. Linn F. Cooper, Georgetown University physician, reports in the *Bulletin of the University's Medical Center*.

The slowing of time's flight was accomplished by Dr. Cooper through use of a metronome beating out a regular tick-tock, tick-tock, at one beat a second. The young lady whom he had previously hypnotized was told the rate. Then she was told that he was gradually slowing down the rhythm until only one tick sounded each minute.

In her trance, she seemed to accept this new notion of time.

Then, Dr. Cooper told her that at a signal she would visit in her "mind's eye" her school when she was in the fifth grade. She would have ten minutes and then would be told to stop.

After ten beats of the metronome—ten seconds—the girl was awakened and asked to tell what had happened.

She said she had had "lots of time," told who she had met and talked with, told of walking down a hall, and described the appearance of the school and her classmates. When she learned that all this had transpired in her mind in ten seconds, not ten minutes, she was amazed.

The same speeding up of activity took place when she was not stopped but allowed to continue until she finished a task but told she must finish within a set time. Once it was suggested to her that she was in a cotton patch near her home. She was to walk along the rows and pick and count the cotton bolls. She counted for what she thought was 80 minutes. She told of doing it carefully, looking under the leaves so that

be, a favorable check to the process of aging. The increased size may, instead, be a kind of artificially produced deformity.

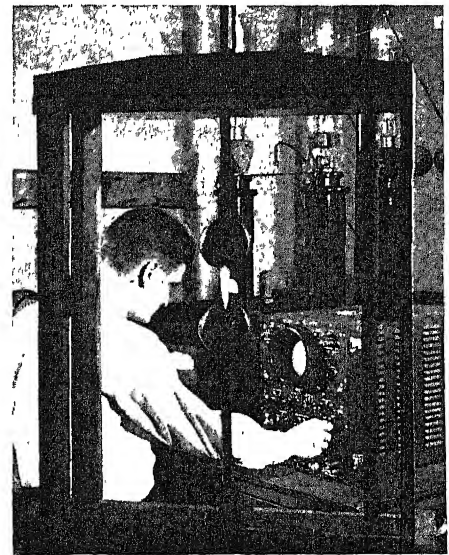
Before any factor can be considered as an anti-aging one, he stresses, especially for treatment of old or aging people, more must be investigated than the changes in weight and size of some organs. For this purpose, both experimentally and clinically, many studies of the biochemical, physiologic and structural changes must be made.

Science News Letter, May 15, 1948

she would not miss any. There were 862 bolls, she said.

Actually it had taken her just 3 seconds. For a waking person it is just not possible to count 862 of anything—even in the imagination—in only three seconds.

Science News Letter, May 15, 1948



"ELECTRICAL YARDSTICK"—It is used for measuring the high voltages required in many scientific experiments. A scientist is shown in the picture adjusting the control instruments as an arc, generated by 90,000 volts of electricity, leaps across the gap between the two spheres of the "yardstick," which is held upright by the frame in the foreground. The distance between the spheres can be used as an accurate measure of the voltage. This research tool is being used by Westinghouse Research Laboratories.

GENERAL SCIENCE

Science Foundation Bill Passes Senate Third Time

➤ A BILL to establish a National Science Foundation has been passed by voice vote in the Senate.

It was the third time over the Senate hurdle for the Foundation which leaders in science, government and industry have been urging since the end of the war.

Two years ago the Senate first passed a bill to create the Foundation, but the legislation died in the House. Last year, both houses passed a Science Foundation measure which President Truman vetoed. The new bill, which now goes to the House, is believed to meet the major objections raised in the President's veto message.

Some scientific and educational groups are already making up lists of names to help the President in appointing the 24 members of the Foundation. In addition to this group, the President, under the new bill, appoints a director for the Foundation. Appointment of the director by the members of the Foundation was provided for in the bill which was vetoed.

The measure would create a civilian, peacetime organization for promoting government support of science. It was proposed originally as a postwar successor to the highly successful Office of Scientific Research and Development which mobilized scientific effort in World War II.

But OSRD has gone out of business and its functions have been scattered, while legislation for the Science Foundation has bogged down. Now, it is hoped, the long-awaited Foundation may at last be approaching formation.

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GENERAL SCIENCE

Academy Issues Statement Criticizing Condon Attack

➤ THE National Academy of Sciences, the "senate" of American science, has approved by a large majority a statement that the treatment of Dr. E. U. Condon, Bureau of Standards director, by the House Un-American Activities Committee "may have the effect of deterring scientists from entering government employ and may diminish the respect with which citizens regard opportunities for service to their government."

The statement approved in a mail

poll prior to the annual meeting held recently also objected to the Thomas committee calling Dr. Condon a menace to national security without having given him a hearing.

Dr. A. N. Richards, president of the Academy, revealed that he had reported to the academicians that Rep. J. Parnell Thomas (R., N. J.) had authorized him to assure the Academy that "Dr. Condon would be treated with complete fairness" in the hearing which subsequently was indefinitely postponed. The Academy is reported to have voted "intense and continuing interest in the conduct and outcome of the forthcoming hearings."

Science News Letter, May 15, 1948

MEDICINE

Three Deaths Traced To Contaminated Solution

➤ AT least three deaths and 10 injuries attributed to an unknown substance contaminating a sugar and salt solution given to critically ill patients have been reported to the U. S. Food and Drug Administration. The reports were from Kentucky, Georgia, Florida and Alabama.

The solution is known technically as five percent glucose in normal saline. Such solutions, given by injection into the vein, are used almost routinely for patients just after surgical operations as well as in other conditions. The contamination occurred in the solution manufactured and distributed by Cutter Laboratories of Berkeley, Calif. Doctors and hospitals have been warned not to use bottles of this solution bearing the code number CM 8164, and to notify the Food and Drug Administration immediately if they have any in their possession.

All Food and Drug Administration laboratories have been put to work on the problem of identifying the contaminating substance, while field officials are making a nationwide survey to track down the several hundred bottles of the original shipment which have not yet been recovered.

Vomiting, diarrhea, cyanosis (blue skin color) and very low blood pressure are the symptoms reported after use of the contaminated solution.

Food and Drug Administration action started when the American Medical Association notified them that a Kentucky physician had reported injury to a patient following use of the Cutter glucose solution.

Science News Letter, May 15, 1948



PLANT PHYSIOLOGY

Plants Need Some Zinc To Promote Proper Growth

➤ ZINC is needed in microscopic quantities by plants to promote normal growth. This role of the metal in plant nutrition has been proved by researches conducted in the botany laboratories of the University of Wisconsin by Dr. Cheng Tsui.

Tomato plants grown in a culture solution without the slightest trace of zinc grew a few inches, then stopped. When a little zinc was added, they resumed growth and eventually became almost normal.

Zinc-deficient plants were found upon analysis to be very short of the natural growth-promoting substance known as auxin, and also to be short in the protein building-block, tryptophane, from which auxin is formed in the plant. The direct effect of zinc lack appears to be in blocking the synthesis of tryptophane.

Details of the experiments are reported in the *American Journal of Botany* (March).

Science News Letter, May 15, 1948

DENTISTRY

Dentist Population Has Increased by 8,000

➤ YOU have a better chance of seeing a dentist if you live in the middle east and central states than if you live in Southeast or Southwest, the latest roll call of the nation's dentists shows. The roll was called by the American Dental Association for its new directory of dentists.

The nation has 8,000 more dentists now than the 1940 census showed. Total number today is 78,490.

Greatest number of dentists in proportion to population are found in New York State. The figure there is one dentist for each 1,106 residents. Next highest is Washington, D. C., with one dentist for each 1,197 residents. Other states well supplied with dentists are: Minnesota, Illinois, Wisconsin, Nebraska, Connecticut and California.

States with fewest dentists in proportion to population include: Mississippi, South Carolina, Arkansas, Alabama and Georgia.

Science News Letter, May 15, 1948



BACTERIOLOGY

Revived Dead Germs Give Clue to Drug Resistance

➤ CLUE to the drug resistance which makes penicillin and streptomycin fail to cure some patients may come from dead bacteria which have been revived.

The revival of these germs, which had been dead to every known test for as long as three days, was accomplished by Prof. George I. Wallace and Miss Ione Rhymer of the University of Illinois.

The bacteria, or germs, had been killed by streptomycin. Reproduction through cell division, common evidence of bacterial life, was halted completely. Some of the germs had even twisted into weird shapes under the influence of the drug. They appeared completely inert. But when a mysterious "inhibiting factor" was added to them, they resumed normal activity and appearance.

The "inhibiting factor" was obtained from the media on which the bacteria had been growing before streptomycin was added. The Illinois bacteriologists found three years ago that bacteria growing in certain media were killed more readily by streptomycin than the same kinds of germs growing on different media.

The chemical nature of the "inhibiting factor" is now being studied by Prof. Herbert E. Carter of the University's chemical department. It may be lipositol, a protein substance customarily obtained from brain tissue or soybeans, or an ingredient of this protein.

Effects of the factor on bacteria and the possibility that bacteria themselves may produce it are also being investigated.

Science News Letter, May 15, 1948

PHOTOGRAPHY

Fastest Camera Shutter Known to Science Revealed

➤ THE fastest camera shutter known to science, capable of operating at a rate of 100,000,000 frames per second, was revealed at the Navy's dedication of the new Michelson Laboratory at the Naval Ordnance Test Station, Inyokern, Calif. It is in the Zarem camera, invented by Dr. A. M. Zarem.

The Zarem camera is about 25,000

times faster than the fastest motion picture camera commercially available. If motion pictures of a bullet leaving the muzzle of a gun were taken at this rate of 100,000,000 frames a second and projected on a screen at the normal rate, the bullet would appear to travel about four feet an hour.

A so-called Kerr cell is the secret of this fast shutter. This cell, long used by scientists, is a glass tube filled with nitrobenzene in which a pair of electrodes is immersed. The Kerr cell is placed between two polarizing plates so set that the polarized light emitted through the first is in the wrong plane to pass through the second. When high voltage is applied to the electrodes in the Kerr cell, the state of the polarization of the polarized light is immediately altered, allowing the light image of the subject being photographed to pass the second plate and on through the camera lens to the film.

By controlled timing of the voltage, photographic records with an effective exposure time of one hundredth of a millionth of a second have been obtained. The camera is designed for use in studying certain rapidly changing phenomena which heretofore science has been unable to observe and record accurately.

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ASTRONOMY-PHYSICS

Moon Does Not Influence Cosmic Rays on Earth

➤ THE moon may shine brightly upon the earth and may even influence human actions through romantic or outmoded superstition, but it can't affect materially the cosmic rays that bombard the earth from outer space.

Dr. Manuel Sandoval Vallarta, Mexican physicist, who has been guest this winter at the Tata Institute of Fundamental Research in Bombay, India, has assayed mathematically the possible effect of the moon's magnetic field on these penetrating particles.

Even though Drs. S. Chapman and P. M. S. Blackett in British studies have been able to compute the magnetic field of the moon, Dr. Vallarta's analysis shows that it is so small that it would affect cosmic rays of only such low energy that they would not be likely to reach the earth. He tells scientists, in a report to the British journal, *Nature* (April 24), that they will have to look elsewhere for an explanation of the daily and seasonal variations in cosmic rays.

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ENGINEERING

First Gas Turbine Engine For Power Plant Revealed

➤ A GAS turbine engine, now under construction, will be installed in Oklahoma City to develop electricity for the Oklahoma Gas and Electric Company, and will probably be the first gas turbine used for an electrical utility in this country.

The engine is being built by General Electric, Schenectady, N. Y., and is a duplicate of a 4,800-horsepower locomotive gas turbine now undergoing tests. The installation will be a 3,500-kilowatt gas-turbine generator set. It will be ready for operation in about a year.

Natural gas will be used for fuel in this gas-turbine installation, a fuel of which this state has an ample supply. Another advantage of this type of power plant is that the gas turbine requires practically no water, and water in this region is not as plentiful as it is in some other parts of the country.

In the gas turbine, fuel is burned mixed with air under pressure in an air-cooled combustion chamber, and the resulting expanded gases are driven against hundreds of vanes on a propeller shaft. Maintenance is low because the gas turbine has only two major moving parts. Oil may be used for fuel as well as natural gas. A coal-burning gas turbine also has been developed, and will be used on locomotives. The coal used must first be very finely pulverized, and burns in the combustion chamber in a swirling mass of air.

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GENERAL SCIENCE

Young Scientists' Training Shouldn't Be Interrupted

➤ TRAINING of students in the natural sciences should not be interrupted by military service in future draft or military training programs, the nation's largest general organization of scientists warned.

The executive committee of the American Association for the Advancement of Science "deems it essential that laws covering the manpower needs of our military forces do not interrupt the continued training of qualified students in the natural sciences on the under-graduate and graduate level," a resolution of the group declared. Members of the committee are 11 American leaders in science.

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ORNITHOLOGY

Antarctic Penguin Hunting

These flightless birds are easily caught but keeping them alive poses problem. Washington has the largest group of emperor penguins assembled in any zoo.

By DR. FRANK THONE

See Front Cover

➤ FOR portly dignity, a trifle on the pompous side, visitors to Washington should not ascend Capitol Hill. They should go out to the National Zoological Park.

There they will find not mere senators, but a conclave of emperors. Solemn emperor penguins, all in impeccable full dress, and all with an air of having just arrived at a momentous, world-changing decision which they aren't going to tell common mortals.

Sometimes they march in decorous procession, the full length of their glassed-in, specially air-conditioned enclosure, then turn around and as decorously parade back again. It is all very impressive—and it doesn't mean a thing. Except, perhaps, "When do we get our fish?"

When the fish do arrive, they are very likely to be distributed by the penguins' oldest human acquaintance, the man who journeyed to Antarctica to collect and bring to Washington the largest group of emperor penguins ever assembled in any zoo, and then nursed them through heart-breaking days of oppressive heat as his ship steamed up through the tropics. He is Malcolm Davis, who runs the birdhouse at the Washington Zoo, and is the world's Number One penguinier. Mr. Davis is shown with three emperors on this week's cover of the SCIENCE NEWS LETTER.

Five-Month Expedition

The big birds now in Washington, each more than half as high as a tall man, were collected during a five-months' expedition along the coasts of Antarctica carried out by two Navy ice-breakers, the *Edisto* and the *Burton Island*. As the two stout ships probed their way along more than half of Antarctica's icy coastline through the perpetual daylight of the South Polar summer, Mr. Davis kept himself on a fireman's schedule. At the lookout's shout

of "Penguins!" he would drop whatever else he was doing, or roll out of his bunk if he was taking a nap, and prepare to land.

Tactics for capture varied. If the birds were more than a quarter-mile from the edge of the ice, an ordinary boat landing sufficed; for while an emperor penguin can make pretty good speed in his first efforts to escape, he tires in about a quarter-mile and can thus be overhauled. But if they were near the edge of the ice, or in the water, one of the expedition's helicopters was called into action. This was, incidentally, the first time helicopters were ever used in hunting penguins. The pilot would fly his whirligig aircraft close to the penguins, and the big birds, alarmed at the disturbance, would head inland. When they had been herded more than the requisite quarter-mile from the water, the pilot would make a landing on the ice and Mr. Davis would pile out and begin the pursuit.

Chasing Penguins

When a penguin tries to get away he turns into a temporary quadruped; does a "bellywopper" and propels himself over the ice or crusted snow with both feet and flippers. He can make pretty good speed this way, but can't keep it up long. Once overtaken, football tactics are in order. You dive at him and try to get a good hold on a flipper. The penguin struggles violently, and since an emperor penguin weighs 50 pounds it is likely to be quite a tussle. Fortunately, says Mr. Davis, the big birds do not offer to use their formidable beaks, merely buck and squirm and try to break away. Fortunately also there was always plenty of voluntary help from members of the crew. Most U. S. Navy men have had at least a little football experience, and penguin catching offered a chance for some rough-and-tumble fun.

After the big bird was subdued, he would be stuffed headfirst into a sea-bag and the mouth quickly secured. The big canvas bag used by sailors for stowing their gear is just the right size

for an emperor penguin, and plenty strong enough to keep him from breaking out. Then a short haul to helicopter or boat, and presently the penguin would be aboard the *Edisto*, making acquaintance with his fellows already in the penguin pen.

In addition to the big emperors, Mr. Davis also captured a number of the little Adelie penguins, of which only four survived the discomforts of the voyage through the tropics. Catching Adelies is much easier, he states. Although they weigh only about seven pounds, as against the emperors' 50, they are as pugnacious as the big birds are pacifist. Adelies come waddling up, wagging their flippers, and in general asking in sign language, "Wanna fight?" So you just swing a long-handled crab-net—and there you have your Adelie.

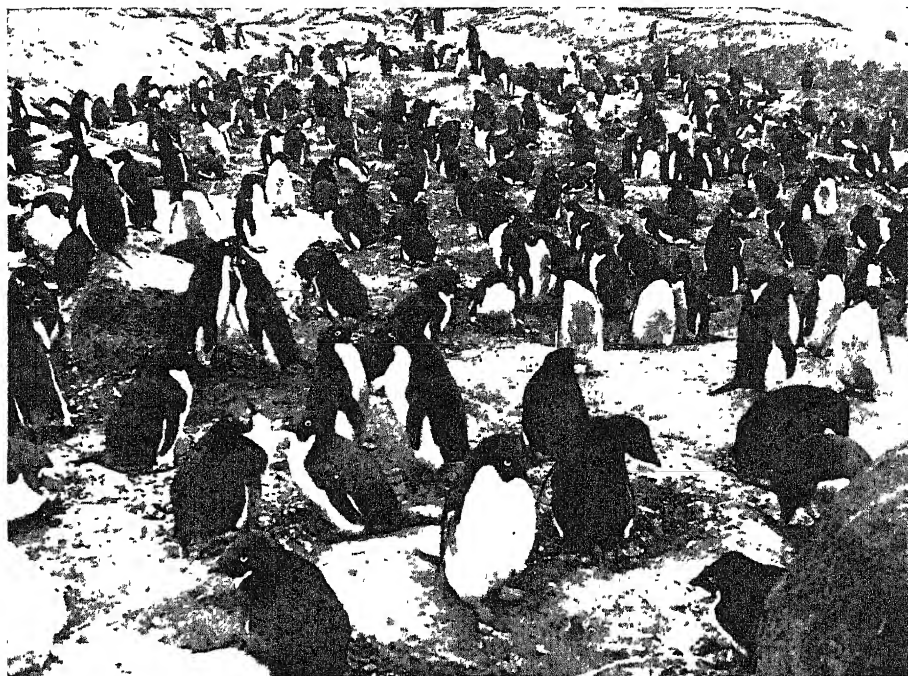
They Can't Stand Heat

While capturing penguins requires far voyaging and strenuous work, it isn't too difficult. Getting the birds back alive is the really heartbreaking job. With the sole exception of the peculiarly adapted Galapagos penguin, no species of this group can stand heat. So while he started on the long northward voyage with 21 emperor penguins, Mr. Davis had to be satisfied to get eight of them to their destination alive.

At that, he fared better this time than he did on his first penguin-bringing expedition, when he sailed to Little America with the U. S. Antarctic Service Expedition of 1939-40. He started back with a contingent of birds but when his ship had made about half the long distance up the west coast of South America they all died. Mr. Davis promptly went back to Antarctica for some more penguins—and got enough of them through alive to justify his trip.

He feels rather acutely on this matter of shipping penguins through the tropics without benefit of refrigeration, for he hates to see penguins die. He is convinced that if he could get accommodations for his birds on a properly air-conditioned ship, or better yet, air-lift all the way from Antarctica to the Washington Airport, he could cut his losses practically to zero.

Mr. Davis not only brought back birds from Antarctica; he took some there. He had with him two pairs of carrier pig-



LITTLE ADELIE PENGUINS—Whole armies of these small flightless birds occupy long stretches of Antarctica's rocky coast.

eons, to test the practicability of using these birds as message bearers under frigid-zone conditions. They were the first pigeons to be flown over Antarctica.

On the trial flights the birds proved two things: that the pigeons actually could find their way back to their home roosts on shipboard, and that they could escape their winged enemies. There are no hawks in Antarctica, but a flesh-eating bird of the gull family, called the skua, takes their place. Once three of the pigeons left the ship on a flight, and were chased out of sight by five hungry skuas. After a couple of hours they returned, with the skuas nowhere

in sight. They had outraced the predator birds so completely that the skuas didn't even figure as also-rans.

So much attention has been paid to penguins that one may get the impression that they are the only birds to be found in Antarctica. This is not at all the case, Mr. Davis states: in addition to the skuas already mentioned there are three species of petrel, cormorant, sheath-bill, kelp gull and Antarctic tern. These are all summer residents only; having wings, they are able to fly north when winter comes. The flightless penguins have to get through the fury of the Antarctic winter as best they can.

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ASTRONOMY

U. S. To See Nine Eclipses

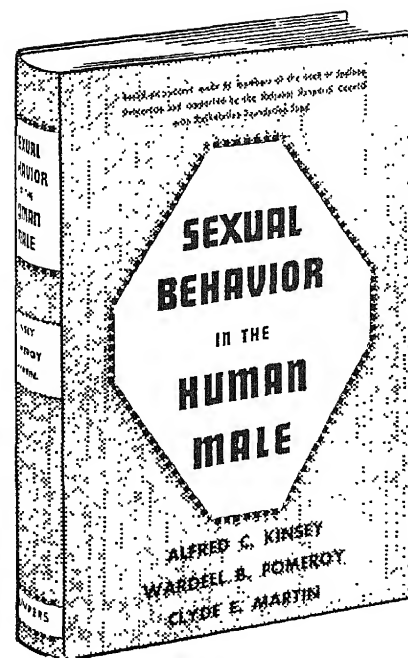
➤ NINE total eclipses of the sun will be visible somewhere in the continental United States during the next hundred years.

The next total eclipse scheduled for observation in this country is that of June 30, 1954. At that time the sun will rise eclipsed for some people in Nebraska. The path of totality will then pass through South Dakota, Minnesota and Wisconsin, cross Lake Superior and continue on into Canada.

The dates of other eclipses to be visible from the United States are as fol-

lows: Oct. 2, 1959; July 20, 1963; March 7, 1970; Feb. 26, 1979; Aug. 21, 2017; April 8, 2024; Aug. 23, 2044; and Aug. 12, 2045. As the paths of totality of some of these eclipses cross within this country, in a few regions the sun may be seen totally eclipsed twice within the next century.

From 1900 to 2050, totality for 15 eclipses falls somewhere within the United States. Thus within this 150-year period, a total eclipse is seen somewhere in this country about once every ten years, calculates Dr. C. H. Clemin-



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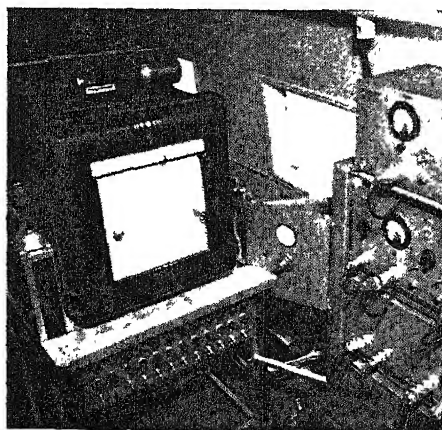
Do You Know?

A family of five needs about 3,000 pounds of fruit and vegetables a year.

The *artesian* well takes its name from Artois, France, the ancient Artesium; the name actually refers to the method by which the well is bored, not to whether it runs water or not.

Some 3,200 *fire towers* and lookout stations of the U. S. Forest Service are to serve aviators in the future; they are being marked as a safety aid to the visual flyers by the Civil Aeronautics Administration.

The mixture of *chemicals* known as 3-amino-phthalhydrazide and sodium perborate is quite stable when dry but when dropped in water it gives a visible glow; wartime seaplane pilots used the mixture to estimate their height above the water.



Speedomax instrument in an airplane, recording variations in the earth's magnetic field.

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Exceptional speed and sensitivity enable the Speedomax Recorder pictured above to chart the output of a magnetometer during oil-surveying operations. These same qualities make the instrument highly useful in spectroscopy, X-ray diffraction studies, measurement of sun-spot activity, recording weather data from radiosondes and other tests.

For details on Speedomax Recorders, see Catalog ND46(1), sent on request.



J. L. Ad. N-420 (1b)

shaw of Griffith Observatory, Los Angeles. The average width of the path from which totality may be seen is about 100 miles.

The last total eclipse of the sun visible in this country was that of July 9, 1945.

Since the turn of the century, for people in a few choice regions of the United States the moon has completely hidden the sun on the following dates: May 28, 1900; June 8, 1918; Sept. 10, 1923; Jan. 24, 1925; Aug. 31, 1932.

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ACOUSTICS

Moth Chewing Through Fabric Is Recorded

➤ THE sound of a "moth chewing through a fabric" has been preserved on a phonograph record by Cornell University scientists.

The scientists last year produced an album of 72 bird songs. Their latest is an album of eight sides featuring the calls of 26 varieties of frogs and toads. But the moth record was made on special request—from an advertising agency with a client selling mothballs.

Getting a moth to chew at the right time and place proved to be the greatest difficulty. This was overcome by sewing the larva in a tiny cloth sack. It had to chew its way out.

And what does a moth chewing cloth sound like? "Someone eating corn flakes," reports one of the scientists, Prof. Paul Kellogg.

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ENGINEERING

Single-Sideband Receiver Applied to Communication

➤ A NEW communication system employing recently developed radio single-sideband techniques offers simplified apparatus and improved performance, Donald E. Norgaard, General Electric Co., Schenectady, N. Y., told the joint meeting of the International Scientific Radio Union and the Institute of Radio Engineers meeting in Washington.

The sideband is a radio wave traveling side by side with the so-called carrier, or principal wave, the steady signal which is radiated by conventional transmitters. The sideband is caused by the carrier wave. This carrier signal changes in strength with the speech or music being sent. In radio language it has amplitude modulation. This modulation sets up the additional waves which are immediately adjacent to the carrier wave. They are ordinarily so close that they

cannot be distinguished from it.

The new development covers both transmission and receiving equipment, Mr. Norgaard stated. When the single-sideband receiver alone is employed on conventional transmission, distortion caused by selective fading is eliminated.

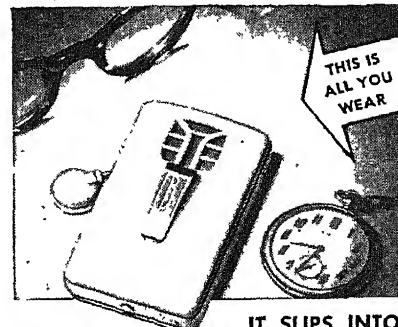
Optional choice of the sideband to be received allows reduction or elimination of interference. For this reason, the single-sideband receiver should find immediate public acceptance whenever reception over moderate or long distances is required with a minimum of interference.

Complete single-sideband operation permits exactly twice the number of transmission channels over present practice, he continued, with a system improvement in each channel. Transmitter efficiency under these circumstances is higher than that of any other system of voice communication by radio.

These factors have resulted in a communication program by the U. S. armed services and United Nations of virtually exclusively single-sideband operation.

Science News Letter, May 15, 1948

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ORNITHOLOGY

Biggest Eggs Taste Best

Small birds' eggs tend to fall in the "relatively unpalatable" group, according to tasting experiments on the flavors of all species and sizes.

➤ **BIGGEST** eggs taste best; littlest eggs are most likely to be bitter.

This general rule covering the flavors of birds' eggs of all species and sizes is derived from tasting experiments made under the direction of Dr. Hugh B. Cott of the University Museum of Zoology, Cambridge, England. Eggs of 81 species of domestic poultry and wild birds, ranging from hen to wren, were sampled by a panel of three judges.

These three men, Dr. J. Brooks, H. P. Hale and Dr. J. R. Hawthorne, had had wartime experience as food tasters in connection with Britain's large-scale purchases of food supplies, so they brought educated tongues to their task. All eggs were served scrambled and steam-cooked, and no species was known in advance to the judges, except the high-grade hens' eggs served as flavor standard or control. Each judge had a chance to sample all species of eggs at least twice during the test period.

By this critical but impartial method of judging, eggs of several species of gulls were rated just under hens' eggs and just over guinea-fowl eggs, but several grades better than eggs of the domestic turkey; though all were in the group pronounced "relatively palatable". A few birds with small eggs, like hedge-sparrow, bullfinch and rock-dove, managed to get into this group.

By far the largest number of small birds' eggs, however, gravitated into the "relatively unpalatable" group. Here

were eggs of such birds as linnet, white-throat, reed warbler and blackcap. At the very bottom were eggs of the common wren, with a rating only one-fifth as high as that of the best hens' eggs.

Eggs of intermediate taste, neither very good nor very bad, included such familiar species as magpie, pheasant, domestic duck, swallow, blackbird, cowbird and catbird.

Birds' diets seem to have little relation to the palatability of their eggs. Thus, eggs of fish-eaters like the gulls and terns ranked near the top, and were not noticeably "fishy" to the taste. Again the scavenger carrion-crow was rated as producer of "intermediate" eggs, actually slightly better than those of pheasant or duck, while the cleanly wren's eggs were least tasty of all.

Some effort was made to test egg-eating animals' tastes, by offering them choices between two kinds of eggs. The animals used—rats, ferrets and European hedgehogs—showed roughly the same preferences as did the human tasters, though there was some disagreement. Closest agreement came over eggs nearest the bottom of the list, which human tongues found bitter. Dr. Cott suggests that bitterness of eggs may have some survival value to birds under natural conditions, by causing possible nest-robbers to turn aside and seek food elsewhere.

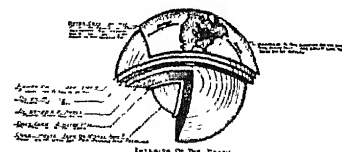
Details of the test are discussed in the journal, *Nature* (Jan. 3).

Science News Letter, May 15, 1948

Mr. Bartlett urged the immediate extensive development of pipe line and tanker transportation for oil mined in the Arabian-Iran-Iraq area. He urged also the construction of refineries in Europe under the European Recovery Plan. This would help make Europe self-sufficient in satisfying its oil needs.

In view of the present shortage of steel, the Middle East offers an advantage. For each ton of steel used, from five to ten times as much oil can be produced. This is because of the comparatively shallow wells and the tremendous volume of oil per well. The average daily production of crude in the United States is about 12 barrels per well; in Venezuela, about 250 barrels; and in the Middle East, about 4,000 barrels, he asserted.

Science News Letter, May 15, 1948



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"I was extremely pleased to receive your beautiful drawing which gives a vivid representation of our solar system. I have hung it on the wall of my room to look often at it. Sincerely yours,"—A. EINSTEIN

"The drawing is excellent and informative. You certainly have given an enormous amount of information in a limited space."—DR. FOREST RAY MOULTON.

"I have never before seen the various features of the solar system and the earth shown so skillfully."—DR. M. M. LEIGHTON.

"The author has produced for display in school or study, a useful quick reference sheet, for the student of elementary astronomy."—JOURNAL OF THE BRITISH INTERPLANETARY SOCIETY, London.

Note reduced sectional view through the earth, which is only one of many drawings included on this one chart.

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RESOURCES

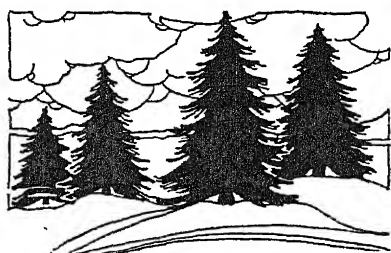
Oil Shale Good for Fuel

➤ **MOTOR** fuels from oil shale should be given an early place in the production of synthetic liquid fuels. Coal and natural gas have other uses. Oil shale has none. Any fuel recovered from it is a net addition to national fuel resources, with no waste involved.

This is the opinion of R. M. Bartlett, vice president, Gulf Oil Corporation, Pittsburgh, expressed to the Fuel Oil Distributors Association of New Jersey. At present, he said, production of synthetic fuel from natural gas has the dis-

advantage of losing about half the heat value of the gas in the process. In the production of motor fuels from coal, about 60% of the heat value is lost.

Synthetic fuel research is urgent, he stated, to conserve American crude oil reserves and as insurance against the possibility of foreign supply being cut off by war. Present research projects will require about three years to complete. The building of commercial plants should be delayed to take advantage of the technical advances that will be made.



Feudal Fortifications

► **WALLED CITIES**, we are told in school, became obsolete with the passing of feudalism. They served their purpose in ancient and medieval times, first as the hard-shelled nuclei of city-states, then as strong centers of resistance to the raids of barbarian hordes and the anarchic attacks of only slightly more civilized robber barons. But with the

firm establishment of modern states and the development of modern arms, the every-town-for-itself idea lost its usefulness.

This may be true in the field of human relations, but when it comes to protection against the wild forces of nature our cities still remain largely medieval. When rivers rise to flood stage in spring, we find river towns becoming increasingly concerned about the height and strength of their river walls. If a neighboring city has a higher and stronger levee there is apt to be a good deal of envious comment in newspaper editorials and radio comment. We even find mile upon mile of embankments along our larger rivers, especially in the South, to protect farm lands. This kind of fortification of whole regions has not been practiced in a military way since the Chinese in Asia and the Romans in Europe built their famous great walls to check the hordes of northern barbarians.

True flood protection of our river

cities and lands, conservationists never tire of pointing out, can be achieved only by stopping the floods where they start—far up on the watersheds, where rivers are still no more than creeks. Reforestation or resodding of sloping lands, to reduce runoff and encourage the absorption of water into the soil and its long-time storage there, will do much to cut down the number of small floods and mitigate the severity of big ones.

These water-conserving measures are also soil-conserving, for they hold the soil in place and prevent it from washing down into the rivers. Once washed into the streams, such ruined soil becomes channel-choking silt and sand, raising the level of the bottom and compelling the building of downstream protective embankments to ever more towering (and costly) castle-like heights. So it is good economics, as well as good civics, to seek your flood protection as far upstream as possible.

Science News Letter, May 15, 1948

HORTICULTURE

Flowers "By the Pound"

► **YOU** may never ask your florist for a "pound of roses" for Mother's Day or any other time, but their weight may determine the kind of flowers you get and how much you pay for them.

A new method of grading cut flowers by weight has been developed in the floriculture department at Cornell University. It promises to help the entire flower industry. Many growers are enthusiastic and anxious to put the new system into operation as soon as possible.

"Quality in cut flowers is best expressed by weight which takes care of size and stem length and size of flower display on the stem," says Prof. Kenneth Post.

"Weight cannot take into account color, crooked stems, odd or misshapen flowers, but the poor flowers are easily eliminated by the sorter."

Flowers already graded in research at Cornell include pompom chrysanthemums, carnations, roses, stocks, snapdragons, and iris. Prof. Post believes research can find grade standards for nearly all cut flowers on a weight per stem basis.

Using the standards, both retailer and wholesaler will know the exact kind of merchandise they get and growers will learn what quality the markets demand.

Consumers also will know what kind of flowers they buy instead of getting a bunch of flowers of all sizes, shapes, and quality.

At present, says Prof. Post, poor flowers are included with good ones and prices may be based on the poorest in the bunch rather than the best. Under the weight grading system, the better and poorer specimens can be grouped by themselves.

Science News Letter, May 15, 1948

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Science Service Radio

► **LISTEN** in to a discussion about "An Archaeological Race Against Time" on "Adventures in Science" over the Columbia Broadcasting System at 3:15 p.m. EDST Saturday, May 22. Dr. William Strong, professor of anthropology at Columbia University, will be the guest of Watson Davis, director of Science Service. Dr. Strong will discuss the problem of the pressing need for emergency archaeological excavations in our river valleys before dams and other flood projects are constructed.

Science News Letter, May 15, 1948

Books of the Week

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AIRBORNE WARFARE—James M. Gavin—*Infantry Journal*, 186 p., illus., \$3.00. The author foresees for future warfare a troop-carrying aircraft that would release the entire fuselage at the destination, the pilot returning with the power plant to pick up another cargo body. He also looks for high-speed chutes that will permit safe jumping at several hundred miles per hour.

THE BLOWFLIES OF NORTH AMERICA—David G. Hall—*Thomas Say Foundation*, 477 p., illus., \$6.50. A systematic account of the 83 species known in North America and familiar to most of us as "blue-bottles".

THE BULLDOG: An Illustrated Standard of the Breed; A Picture Study of Good Points and Faults; Containing Information on the History, Anatomy, Breeding, Feeding, Training and Management of Bulldogs—Enno Meyer—*Orange Judd Publishing Co.*, 151 p., illus., \$3.00.

THE CARE AND MANAGEMENT OF LABORATORY ANIMALS: Handbook of the Universities Federation for Animal Welfare—Alastair N. Worden—*Williams and Wilkins*, 368 p., illus., \$8.50.

ELECTRONIC INSTRUMENTS—Ivan A. Greenwood, Jr., J. Vance Holdam, Jr. and Duncan Macrae, Jr., Eds.—*McGraw-Hill*, 721 p., illus., \$9.00. Treating electronic analogue computers, instrument servo-mechanisms, voltage and current regulators and pulse test equipment, all important adjuncts to many modern radar systems.

THE ENGINEERING SOCIETIES YEARBOOK, The Periodical Reference Book on Engineering Societies, Clubs, and Councils in the United States and Canada—Harry B. Coffin, Ed.—*American Society of Mechanical Engineers*, 95 p., paper, \$3.00.

ESSENTIALS OF RADIO—Morris Slurzberg and William Osterheld—*McGraw-Hill*, 806 p., illus., \$4.00. A textbook for students of radio and others who wish a knowledge of the subject.

FATTY ACIDS AND THEIR DERIVATIVES—A. W. Ralston—*Wiley*, 986 p., \$10.00. Concerned only with those acids which contain six or more carbon atoms and their derivatives.

MANUAL ON WOOD CONSTRUCTION FOR PREFABRICATED HOUSES—Forest Products Laboratory—*Govt. Printing Office*, 330 p., illus., paper, \$1.50. For all those interested in planning or in building—a wealth of information and "know-how."

THE MODERN METALLURGY OF ALLOYS—R. H. Harrington—*Wiley*, 209 p., \$3.50. A reference book and text for students, instructors, and practicing metallurgists.

OUR ENEMY THE TERMITE—Thomas Elliott Snyder—*Comstock*, rev. ed., 257 p., illus., \$3.50. A new edition of an important book which has been out of print for several years. Damage done by this insect is described, as well as methods of control, but the author warns against exaggerated fears.

POULTRY HANDBOOK: An Encyclopedia for Good Management of All Poultry Breeds—Rudolph Seiden, Ed.—*Van Nostrand*, 410 p., illus., \$6.00. Information for poultry raisers all in alphabetical order.

PHYSIOLOGIC THERAPY IN RESPIRATORY DISEASES—Alvan L. Barach—*Lippincott*, 2d ed., 408 p., illus., \$9.00. On the use of oxygen, carbon dioxide, rare gases, helium, positive pressure, alternating pressure, equalizing chest pressures and aerosols.

PSYCHOLOGICAL WARFARE—Paul M. A. Linebarger—*Infantry Journal*, 259 p., illus., \$3.50. The understanding of psychological warfare and the defenses against it is an important part of winning not only the victory but the peace. Here is distilled the experience of the author as civilian expert and as Army officer in World War II.

PULSE GENERATORS—G. N. Glasoe and J. V. Lebacqz, Eds.—*McGraw-Hill*, 741 p., illus., \$9.00. Report of research developing from the need for equipment capable of delivering high-power pulses for a microwave-radar system; the techniques are, however, applicable to many problems in physics and engineering.

THROW ME A BONE: What Happens When You Marry an Archaeologist—Eleanor Lothrop—*McGraw-Hill*, 234 p., illus., \$3.00. The author got a lot of amusement out of the archaeological expeditions to Chile and Guatemala which constituted her honeymoon.

VIOLIN VARNISH: A Plausible Re-Creation of the Varnish Used by the Italian Violin Makers Between the Years 1550 and 1750 A.D.—Joseph Michelman—*Joseph Michelman*, 185 p., \$3.75. The results of research into old manuscripts and chemical experimentation presented for the benefit of scientists, collectors, and violinists.

Science News Letter, May 15, 1948

France, until about a decade ago, furnished America with most of its cigarette paper, using linen rags of Europe as a source of materials; America now makes its own cigarette paper and makes it from home-grown flax.

MEDICINE

Sex Hormones May Help Heal Broken Bones in Aged

SEX hormones may help the healing of broken bones in old people, it appears from a report of Dr. W. O. Thompson of Chicago to the American College of Physicians meeting in San Francisco.

Male hormone treatment of broken bones in old men is one of 14 uses of this material listed by Dr. Thompson.

Use of the hormone is based on its influence on the growth of bone and laying down of calcium in bone. Not enough observations of the hormone's effect in broken bones have been made to prove beyond doubt that it is helpful, Dr. Thompson cautioned, but several scientists have observed good results.

Similar improvement, he said, has been reported in older women with broken bones as a result of doses of female hormone, which also influences growth of bone.

Science News Letter, May 15, 1948

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• New Machines and Gadgets •

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☛ **INTERCHANGEABLE FRAMES** for eyeglasses permit the use of frames to match milady's dress, using the same pair of lenses. These can be shifted from one frame to another by the use of notched lock-joints built into the frames and ordinarily invisible.

Science News Letter, May 15, 1948

☛ **STEEL-AND-TIN CONTAINERS** for photoflash bulbs during shipment by airplanes are designed to protect the bulbs from premature ignition by radar waves transmitted by airport radar stations. In exhaustive tests, the metal of the container was found, it is claimed, to deflect the radar impulses.

Science News Letter, May 15, 1948

☛ **SAFETY VALVE** tire core, which fits any standard type tire valve, automatically releases excessive air pressure, providing protection against blow-outs caused by air expansion during hot weather. The device, easily installed, can be set to accommodate any air pressure range the motorist may desire.

Science News Letter, May 15, 1948

☛ **KEY RING CHAIN** and flashlight in combination takes little space in the pocket and makes the finding of the keyhole on car door or ignition easy. The flashlight, in an attractive plastic casing, is a little over three inches in length; the chain is long enough to reach the lighted keyhole.

Science News Letter, May 15, 1948

☛ **FLOOR-WAXER** has a five-foot handle, that holds a gallon of liquid wax, and an 18-inch sheepskin-covered



sweep, as shown in the picture. Wax flows into the sweep from the handle through a water-tap type control. The empty waxer, with its light-weight plastic handle, weighs only 3.5 pounds.

Science News Letter, May 15, 1948

☛ **SHAMPOO TRAY** for home use fits around the back of the neck under the hair, and has an open end which projects over a sink. It is made of rust-proof aluminum, and has two suction cups to hold it in place, fastened either to the center or side of the basin.

Science News Letter, May 15, 1948

☛ **WOOL-FACED RUGS**, priced considerably lower than woven carpets, have color and design applied by a giant six-color rotary press. The wool surface is

needed, not woven, into a jute backing to make this soft-surfaced floor covering.

Science News Letter, May 15, 1948

☛ **MATTRESS COVER** and hospital sheeting coated with synthetic rubber has tensile strength that makes it safe from tearing or other injury even by violent patients. It is resistant to oil, boiling water, steam and to chemical sterilization.

Science News Letter, May 15, 1948

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Question Box

ARCHAEOLOGY

From what does "ostracism" gets its name? p. 307.

ASTRONOMY-RADIO

How does the moon affect reception? p. 309.

HORTICULTURE

What would be the advantage of grading cut flowers by weight? p. 318.

Photographs: Cover, Fremont Davis; p. 307, Antony E. Raubitschek; p. 309, Carnegie Institution Department of Johns Hopkins Medical School; p. 311, Westinghouse Electric Corp.; p. 315, Navy.

MEDICINE

How can patients be saved from dying of a certain kind of heart attack? p. 310.

How may hormones check aging? p. 311.

What are the two new weapons for fighting high blood pressure? p. 308.

What is the difference between the two kinds of jaundice? p. 306.

RESOURCES

What would be the advantage of using oil shale for motor fuel? p. 317.

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SCIENCE NEWS LETTER

Vol. 53, No. 21

THE WEEKLY SUMMARY OF CURRENT SCIENCE • MAY 22, 1948

JUL 1948



Important Step

See Page 324

A SCIENCE SERVICE PUBLICATION

MEDICINE

New Test for Hookworm

Quantitative evaluation makes possible more accurate prescription of drugs for treatment of this and other worm diseases.

➤ A NEW diagnostic test which will help toward better treatment of diseases afflicting hundreds of millions of people throughout the world was announced at the Congress of Tropical Medicine and Malaria in Washington, D. C.

The diseases are hookworm and the fluke-caused sickness called schistosomiasis. The test would probably be effective for any disease in which worms or flukes get into the body and give off eggs. It was devised by Drs. Elmer H. Loughlin, Samuel H. Spitz, Richard H. Bennett and Jerome P. Margolies of Long Island College of Medicine, Brooklyn.

With this test, doctors will be able for the first time to tell exactly how many hookworms or blood flukes are in the patient's body. He can then prescribe much more exactly the amount of medicine needed to free the patient of the worms or flukes, and get him well.

The test also makes possible for the first time accurate diagnosis of these diseases in patients having only a light infection. This will help many who come back from the tropics with a vague intestinal disorder that baffles the doctor and does not get better under ordinary treatment. But with the new test, the doctor can find out exactly what does ail the patient and give a drug that will cure him.

Schistosomiasis is found in Egypt, many Mediterranean countries, China, Japan and the Philippines. The flukes

are carried by snails. Humans get them from drinking or bathing in infested waters. Some 85,000,000 persons throughout the world are afflicted with this condition and another 457,000,000 have hookworm, according to surveys based on previous tests for the disease. But these tests only showed heavy infections. If the light infections that can be detected by the new test were found, the total figures would be very much higher.

One out of every three or four persons in the United States is probably carrying some kind of worm or fluke or ameba in his body, the Long Island doctors estimate. They base this on the numbers they are finding in Brooklyn with their new test. Many who have these worms and other parasites do not know it and may not even be sick. But there is danger of their spreading the diseases, just as healthy carriers of typhoid germs can unknowingly spread that disease.

Tests for the fluke and worm diseases all depend on finding the eggs in the intestinal wastes. The new test concentrates the eggs, so that even if there are only a few, they will be detected. Since it is quantitative, and since scientists know how many eggs a female hookworm, for example, will discharge in a day, the test gives the number of worms in the patient's body. The shape, size and structure of the eggs, seen under the microscope, tell which kind of worm or fluke the patient is harboring.

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botanist to set eyes on the trees, is now growing seedlings for planting on this side of the Pacific.

A Metasequoia Conservation Committee has been set up, with members representing this country as well as China. American members, in addition to Prof. Chaney, are J. Leighton Stuart, U. S. ambassador to China, and Dean Roscoe Pound of the Harvard Law School, who was a front-rank botanist before he decided to make the law his career. Chinese members are the philosopher Hu Shih, former ambassador to Washington, Wong Wen Hao, advisor to Chiang Kai-Shek, and Han Lih Wu, vice minister of education.

The "dawn sequoia," a species previously known only from fossils and supposed extinct for at least 20,000,000 years, was recently found alive in the deep interior of China. A few weeks ago Prof. Chaney made a special journey to see it, starting by flying across the Pacific and winding up by tramping dozens of miles over muddy mountain trails.

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MEDICINE

Change in Fluid Balance May Kill Malaria Victims

➤ A CONTRIBUTING cause of death in malaria may be a change in fluid balance in the body and not the malaria germs themselves. Studies with monkeys and humans suggesting this were reported by Dr. Richard R. Overman of the University of Tennessee College of Medicine.

The same condition may be the cause of the debility after an attack of malaria, Dr. Overman thinks.

During the attack of malaria, he finds, the walls of the body's cells become more permeable. Substances get inside the cells which normally should not be there. Dr. Overman believes the intermittent fever of malaria is what makes the cell walls permeable. The same thing may happen, he suggests, in other diseases with fever that comes and goes.

The cell permeability can be reversed by treatment with anti-malaria chemicals. But if the condition becomes serious enough, it is no longer reversible. This was the case in monkeys and Dr. Overman believes it also occurs in humans. Monkeys given anti-malarial chemicals after the fluid upset had become serious died, though the chemicals had killed all the malaria parasites.

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CONSERVATION

China Has National Park

What may be the first of a park system like ours includes a special area for preserving the "dawn sequoia" trees previously known only from fossils.

➤ CHINA has made the beginning of what may grow into a National Park system like that of the United States, by setting aside a special area for the conservation of the recently discovered

"dawn sequoia" trees in the Valley of the Tiger. Announcement of this move was made simultaneously in China and at the University of California, where Prof. Ralph W. Chaney, first occidental

MEDICINE

Better than Morphine

Metopon, derived from opium, relieves pain of dying cancer patients. Is habit-forming, but addiction builds up less rapidly. Methadon even better.

➤ A DRUG better than morphine for stopping the intense pain of dying cancer patients is now available. Called metopon, it is derived from opium, like morphine. It is habit-forming like all opium drugs, but addiction to it builds up more slowly.

This latest step in man's conquest of pain was reported by Dr. Nathan B. Eddy, of the U. S. National Institute of Health, Bethesda, Md., speaking before the analgesics conference of the New York Academy of Sciences.

"Metopon has no equal for oral (mouth) administration for chronic pain," said Dr. Eddy, "if its use is started before tolerance and dependence on other narcotics have developed."

The patient being treated with metopon does not get as much feeling of well-being (euphoria) as injections of morphine would give him. Tolerance to the drug, making larger and larger doses necessary, develops more slowly than with morphine.

Metopon is made from opium by a "distressingly complicated process," Dr. Lyndon F. Small, National Institute of Health chemist, told the conference.

For over a decade chemists have attempted to produce a drug as effective as morphine in stopping pain without morphine's ability to make addicts of its users. Metopon does not quite succeed in this respect. No active morphine derivative has yet been made which is free of addiction liability.

Given by mouth metopon has given fair or better relief of pain in the last stages of cancer in 74 out of every 100 patients, Dr. Eddy reported. In those patients who had not previously been given morphine or related substances, metopon gave fair or better pain relief in 91 out of every 100 patients.

Metopon, being an opiate, comes under the control of the Federal narcotic drug laws. In order to make doubly sure that it would not be misused and create new drug addicts, it has been released only for use to relieve chronic pain in cancer patients. This was possible be-

cause the patent for the drug was assigned to and is now owned by the United States government. The distribution procedure provided also for doctors prescribing it to supply Dr. Eddy with information on results of its use.

Methadon Superior

Best drug so far, for the relief of pain in dying cancer patients is the synthetic drug, methadon, known also as amidone and dolophin.

Its superiority among a group of four new pain-killing drugs tested at Me-

morial Hospital was reported by Dr. J. S. LaDue at the same conference.

The other three drugs tested were two known only as NU 896 and NU 1196 and metopon.

Methadon is superior in some respects to the opiates, which include morphine itself, Dr. LaDue reported. One of its advantages is that it does not produce euphoria, or a feeling of well-being, except in very large doses. Small doses of opiates uniformly produce euphoria.

For nervous, apprehensive patients, however, the lack of euphoria is a disadvantage.

Methadon, which is definitely a narcotic drug, is just about ready for release, Dr. LaDue said.

A dozen or more new pain-killing drugs are still waiting to be tested. The Memorial group expects to try these as soon as possible in the hope of finding the ideal pain-killer for cancer patients.

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AERONAUTICS

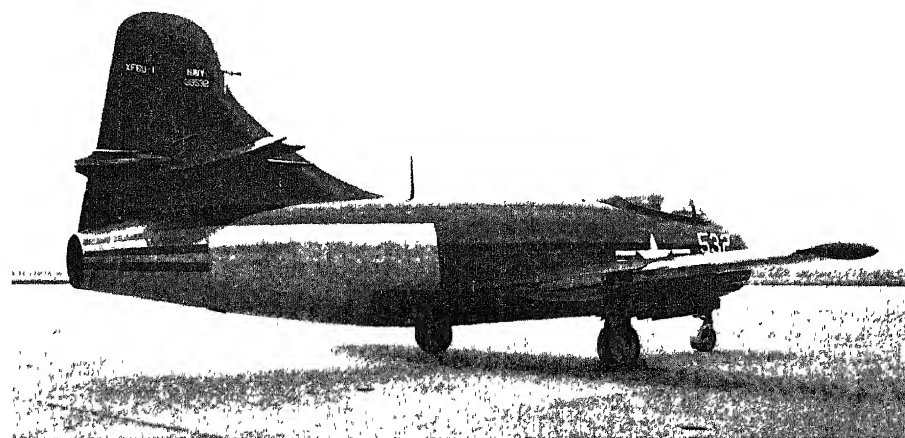
Afterburner Adds Speed

➤ A RAM-JET-LIKE device called an afterburner, which is attached on the exhaust of a jet-engined airplane to give special spurt when needed, will be installed on Navy Pirate fighting planes, it was revealed by Solar Aircraft Company. Under present plans many of the Navy's Chance Vought XF6U-1 Pirate fighters will be equipped with this auxiliary jet unit.

The afterburner being installed is a cylindrical device eight feet long which is attached on the exhaust nozzle of

the Westinghouse turbo-jet engine which powers this plane. Fuel is injected into the cylinder into the gases from the turbo-jet engines, which contain a surplus of oxygen. Combustion immediately takes place, and the gases formed under pressure add extra thrust which increases proportionately with the speed of the aircraft.

The ram-jet has been called the flying stovepipe because of its simple shape. It operates somewhat similarly to the turbo-jet but has no turbines or moving



AFTERBURNER—This cylindrical device on the rear will be installed on Navy Pirate fighting planes.

Linlithgow Library.

and Agricultural Research Institute

parts. When traveling through the atmosphere, it operates only after acquiring enough speed from some other source to pick up sufficient air under pressure to produce combustion with fuel fed into its tapering cylinder. In the afterburner the oxygen for combustion is provided in the exhaust from the turbo-jet itself.

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METALLURGY

German Magnetic Alloy Now Made in America

➤ A FORMER German magnetic alloy, particularly suitable for use in rectifiers to change alternating electric current into direct current, has now been produced for the first time in the United States at the Naval Ordnance Laboratory, White Oak, Md., the Department of the Navy revealed.

This valuable alloy, known as Permenorm 5000-Z, is a result of a fusion of nickel and iron under an intricate heat-treatment process. It was first made in Germany in 1943, where it was applied in the electrochemical industry in the construction of huge rectifiers.

Unfinished samples of the new alloy were brought to this country after the close of the war by American scientists, and distributed to American governmental and industrial laboratories to be duplicated for domestic uses. Although details of the process were available, no laboratory until now was successful in producing the type of alloy which had the required magnetic properties.

Permenorm 5000-Z has important applications in the fabrication of magnetic amplifiers to give additional strength to feeble electrical pulses. Employed for this purpose, it may replace many of the complicated, delicate and troublesome electronic tube amplifiers now used in guided missiles, equipment to control gun firing, and underwater ordnance.

Credit for the reproduction of the alloy and its new applications goes to Dr. Gustaf W. Elmen and Edward A. Gaugler, physicists at the Naval Ordnance Laboratory. Dr. Elmen, well-known as the inventor of other magnetic alloys, served as consultant, while Mr. Gaugler was actively in charge of the project. At a scientific meeting to discuss magnetic materials, to be held at the Naval laboratory in the near future, the Permenorm development will be described at length.

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MEDICINE

Hope for Amputees

New suction socket makes walking more comfortable and easy for those who have lost legs. New arms make it possible to shave self or drive truck.

See Front Cover

➤ SUCTION SOCKET that makes an artificial leg feel like part of the amputee's own body. A hook so controllable that it can pick up a marshmallow or a hamburger. A natural looking dress hand, with thumb motion, that will cost a fourth or a sixth the price of present motionless dress hands.

These are among the new artificial arms, legs and hands and hooks demonstrated at the National Academy of Sciences. They were developed by governmental, industrial and university laboratories in a program sponsored by the Army, Navy, Air Forces and Veterans Administration and coordinated by a National Research Council Committee.

Certificates of appreciation were presented in Washington by Secretary of the Army Kenneth C. Royall to 15 of 27 amputees who have tested the devices and made valuable suggestions for improvements. The other 12 are receiving their certificates at ceremonies in other parts of the country.

At least 200 of the suction sockets have already been successfully fitted. The second phase of the experimental program, now being started, will supply about 450 more. The socket holds the leg on by suction, created by the intake and outgo of air as the amputee walks. It replaces the heavy belt around the hips now used to hold on artificial legs. Besides feeling comfortable, the suction socket actually builds up the leg, or stump, in contrast to the pale, anemic condition that may develop with present leg attachments.

The young veterans shown on the cover of this week's SCIENCE NEWS LETTER are demonstrating that with the new leg it is possible to put the weight of the body on the artificial leg when going downstairs. This has been impossible with the older types, as has also putting the foot flat on the step. Suction socket with combination valve and knee flexion and ankle rotation with some lateral motion make this possible.

"The hook of the future" is the en-

thusiastic description given by Pfc. Leo J. Qualiotto, Cleveland, to the one that picks up a marshmallow. Mr. Qualiotto has been testing hooks, hands and arms since October, 1946. Officially it is known as the Army Voluntary Hook. Its advantage is that the user can control the closing and pressure of the hook, using whatever degree of grip he wishes.

The dress hand with movable thumb

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can be used to hold a telephone or a cigarette, to write and to perform a few other functions. Even more useful will be another Army dress hand with movable fingers as well as thumb.

Important advance for the person without hands is the new wrist flexion unit. This allows 22.5 degrees extension and 45 degrees flexion, or bending. With the 45 degree flexion, the hook can be brought right up against the body, which makes shaving and unbuttoning a shirt possible, explained Jerry Leavy, of Los Angeles, one of the testers for the artificial limb program. Mr. Leavy, incidentally, has become so proficient in the use of his two artificial arms that when he applied for a license to drive a station wagon, he finished up with a license for driving a truck.

The wrist flexion unit can be attached to any standard artificial arm. It has been released to the Veterans Administration and will be ready for the market as soon as VA puts through its procedures for releasing it.

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ENTOMOLOGY

Effects of Insecticides Need Study for Best Use

➤ CHEMISTS have been providing deadly insecticides so fast, of late years, that entomologists have not yet been able to find out their most effective uses, Dr. T. Walter Reed of the California Spray-Chemical Corporation, Haddonfield, N. J., told an American Chemical Society meeting in Bristol, Va.

DDT, benzene hexachloride, chlordane, chlorinated camphene and other insect-killing compounds are now being used in mixtures instead of "straight," he stated. A mixture of DDT, benzene hexachloride and sulfur, for instance, has had maximum effect on boll weevil. Locust plagues may be made a thing of the past through airplane use of chlordane, chlorinated camphene and benzene hexachloride.

But above all, field scientists must study the effects of their new weapons beyond the immediate attack on specific pests. There is always some offsetting disadvantage, in the destruction of beneficial insects or other useful life forms, and it will require great knowledge and care to see that the bad does not overbalance the good.

Science News Letter, May 22, 1948

AERONAUTICS

Flight Training on Ground

Electronic Flight Simulator duplicates in exact detail the cockpit of a Stratocruiser with electronic devices for simulating flight conditions.

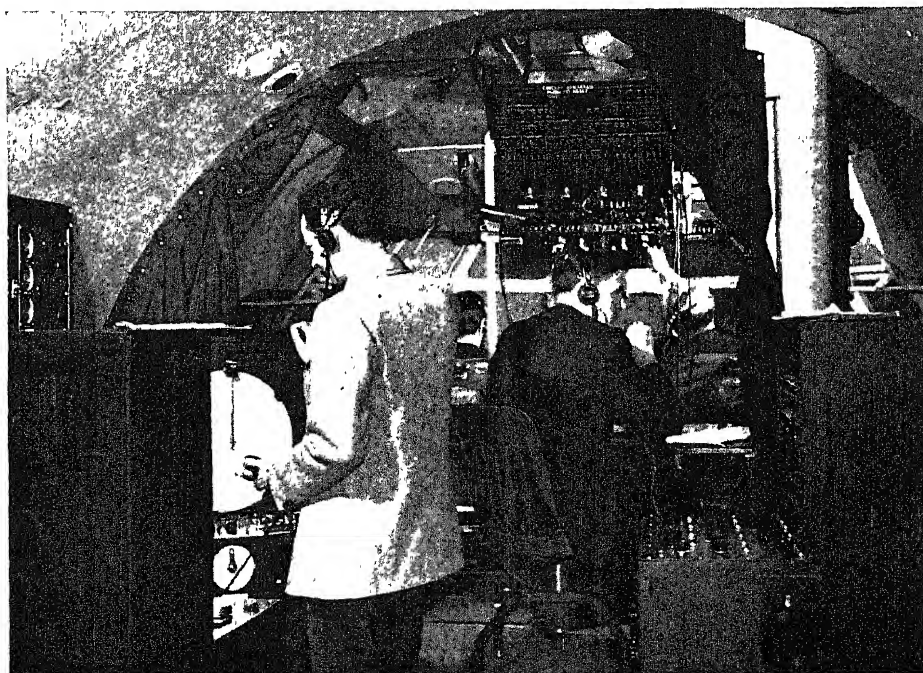
➤ PILOTS of the future, particularly those who handle giant passenger airplanes, will receive much of their training without leaving the ground. This will be the training that has to do with operation techniques, and the ground-training is made possible by the development of a huge electronic-mechanical device in a model of a cockpit with all the hundreds of dials, levers, switches and controls which a pilot encounters in a plane.

This device is called the Electronic Flight Simulator. It reproduces in exact detail the flight deck or cockpit of the airplane whose performance it is designed to reproduce. It incorporates all the existing aerodynamic data upon which the plane itself was produced. Without leaving the ground, it can accurately simulate any condition of flight

of which the plane itself is capable.

The simulator was conceived and designed by Dr. R. C. Dehmel of the Curtiss-Wright Corporation, with the cooperation of Boeing Aircraft Company. It is a complete replica of the Boeing Stratocruiser-type giant transport cockpit. The instruments and controls function precisely as in the real airplane. The device has just been purchased by Pan American Airways, and will be used in pilot training for handling Pan American Stratocruisers. Similar simulators can be built to aid in training for other planes.

This flight simulator cost some \$250,000 to build, and this does not include the cost of ten years of research work which preceded its actual construction. It looks like a lot of money to put into



SIMULATED FLIGHT—Instructor supervises a simulated flight in the Curtiss-Wright Dehmel Electronic Flight Simulator with a Pan American World Airways crew in an exact duplicate of the cockpit of the Boeing 377 Clipper. On the left, the instructor watches the "scriber" trace the performance of the crew. The flight engineer, center, checks his engine instrument readings and reports to the pilot.

one training device, but as a "training plane" it can handle four times the number of flight and ground crews at a tenth the cost and in a fraction of the time involved in the use of an actual airplane.

One important feature of this new flight simulator is that the entire operating crew, pilot, co-pilot, engineer and

others, are trained at the same time. An instructor behind them operates switches which activate the pilot's dials to indicate trouble with fuel flow, wrong oil pressure, carburetor icing, faulty spark plugs and other difficulties. Pilot response is noted by him, and also the corrective action taken.

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NUCLEAR PHYSICS

Future Atomic Advances

➤ **EXPERIMENTAL** atomic power plants "within a year or two" and ships running on atomic energy "within a decade" were forecast by a famous American atomic scientist.

The scientist is Dr. Edward U. Condon, director of the National Bureau of Standards, who has been under attack from a subcommittee of the House Un-American Activities Committee. Dr. Condon's views on the future applications of atomic energy are given in a report to the American Institute of Electrical Engineers in New York. (March 10)

"Three atomic power plants are now under way—at Oak Ridge, Tenn., Chicago, Ill., and Schenectady, N. Y.—and it should be possible to realize experimental production of power within a year or two," the atomic scientist forecast.

For cars, planes or even railroad loco-

motives, atomic power plants are likely to be too heavy, he believes.

"However, it is reasonable to suppose that within a decade some ships may derive their power from (atomic) piles."

Other atomic advances expected by Dr. Condon include better ways of producing the atomic bomb elements uranium 235 and plutonium, smaller-sized chain-reacting piles, important "special purpose energy sources" and aids in medical and other scientific work.

Whether or not other elements can be used to release atomic energy "can be decided only by future research," declares the scientist.

"At present no means of doing this is in sight, but it should be remembered that in 1938 the atomic bomb would have seemed fantastic to the best nuclear physicists."

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CHEMISTRY

Fresh Water from Ocean

➤ **SCIENTIFIC** research to make fresh water from sea water is proposed by a bill introduced in Congress by Rep. Charles K. Fletcher, R., California, which would place the study in the hands of the Navy.

The measure would authorize the Secretary of the Navy to construct, and operate one or more demonstration plants to produce potable water from sea water, or other liquids, elements or substances. These plants would be of a size to provide engineering data for industries desiring to convert salt water to fresh for manufacturing and other purposes.

De-salting sea water has long been carried out by the ordinary distillation process on shipboard and other places. This of course requires considerable fixed equipment. During the war there

were several de-salting methods developed primarily for use on lifeboats and life rafts which required only such equipment as could be easily stored with other supplies in the boats and rafts.

The outstanding method uses a new chemical de-salter. It is a product of Permutit Company of New York. A briquet of it, the size of a small candy bar, is dropped into a plastic bag containing sea water. It absorbs the chemical salts in the sea water so that they can be filtered out as the water is sucked through a plastic tube. Each briquet weighs only one-sixth as much as the drinking water produced and takes up only one-tenth as much space. One briquet is good for about a pint of drinking water. The entire kit for a life raft is the size of a small hand-bag.

The principle employed in this and other de-salting methods is what is

known as ion exchangers. These cause an interchange of ions between the material in solution and the solid introduced. The process is used in water softeners. The particular type used to freshen sea water is known as anion exchangers or acid absorbers. They absorb the acids formed when a salt containing water is passed through a hydrogen exchanger.

During the war scientists at the Naval Medical Research Institute tested a dozen or so de-salters suggested for downed flyers on life rafts. Most of them were rejected as unsatisfactory for one reason or another.

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PHYSICS

Measure Water Vapor in Gases by Improved Means

➤ **A WARTIME** need for a quick method to determine the dryness of aviators' oxygen led the National Bureau of Standards to develop an improved electrical method for measuring small amounts of water vapor in many kinds of gases and the moisture content of certain liquids and solids.

The method has just been made public. Essentially it depends upon the change in electrical resistance of an electrolytic film as it absorbs vapor. It is a procedure carried out with speed, simplicity, high sensitivity, and wide range. It was developed by E. R. Weaver of the Bureau staff.

The principle utilized has been employed at the Bureau in various devices for some time. A thin film of liquid, which may be phosphoric acid or a solution of sulfuric acid or other electrolytic compounds in a gelatin or plastic binding material, is spread over the surface of a solid insulator between metallic electrodes. The electrolyte absorbs moisture and tends to reach equilibrium with the water vapor in the surrounding gas and to form a solution the electric conductance of which is a measure of the concentration of water vapor in the gas.

In the improved method, the electrical resistance of a film in the gas of unknown moisture content is compared with one in a sample gas containing a known amount of water vapor. By adding measured moisture to one or the other a balance can be obtained, and the moisture content of the unknown quickly determined.

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The rare *trumpeter swan* is appearing in southern Alaska in growing numbers.

PSYCHOLOGY-FORESTRY

Spotting Forest Fires

Men with exceptional eyesight can see the thin wisp of smoke that signals a starting fire at a distance of nearly 16 miles. Four miles gained by haze cutter.

➤ HOW far away would you be able to see the tell-tale wisp of smoke that means the start of a forest fire?

Some of Uncle Sam's forest fire fighters with exceptional eyesight could spot it at a distance of nearly 16 miles. This is revealed in a report by George M. Byram and George M. Jemison of the Southeastern Forest Experiment Station.

Keen eyesight is very important in spotting fires. The man with keen vision can see about 10% farther than the man with only average eyesight. This 10% reduction in distance might mean a 35% increase in the size of a fire before it would be spotted by the just average man.

A special eyesight test has been developed for picking fire spotters. It does not have the familiar "E's" and other letters on it but measures your ability to see a single black spot 1/16 inch in diameter on a sheet of white paper seven inches square. If you could see a dot the size of one of the letters in this type at a distance of 72 feet, you, too, could spot a beginning forest fire more than 15 miles away.

That is, you could if there was not too much haze and if the smoke were the right color. Haze cuts down greatly on the distance at which you can spot smoke. But the color of the smoke is important, too. Dry fuels give off darker or less smoke than do wet fuels.

The blue, thin smoke from a dry grassy hillside has less contrast with its background and so is much harder to see than the white smoke from a moist area.

About four miles can be gained in visibility range for white smoke on a day when haze would normally limit vision to about 10 miles. This is accomplished by use of a "haze-cutter." Ordinary colored filters do little or no good except to cut down the glare in the observer's eyes, the investigators found. But the haze-cutter takes advantage of the fact that the light from haze is polarized while white smokes give off unpolarized light. The haze-cutter is a polarizing screen turned so as to cut off polarized light, thus making the white smoke show up in contrast to the background. To use it on thin blue smoke, which is almost completely plane-polarized, you just use the haze cutter in reverse, letting it transmit the polarized light.

Other ways in which things can be made easier on the eyes of Uncle Sam's fire spotters, include providing them with goggles that cut down the bright light that tires the eyes, painting the inside of lookout houses white with lower walls and floors a dark color to cut down contrast with the outdoors, and using plate glass at eye level slightly tilted to improve visibility and eliminate glare.

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reducing the recommended calorie allowance was that the original figure has been shown by studies since 1941 to be higher than people actually need. Eating up to the allowance might cause too much weight increase for good health.

Recommended allowances for protein (from meat, fish, eggs, cheese and the like), and for vitamin A and iron were not changed from those originally recommended by this group shortly before the start of the war.

A reduction in thiamin, or vitamin B₁, allowance, recommended by the board's committee on dietary allowances, was referred back to the committee for further study.

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TECHNOLOGY

Nylon Carpet Is Durable And Easily Cleaned

➤ CARPETS of nylon are now available for home use. They offer a luxurious floor covering that should endure for many years.

Because du Pont nylon is easily cleaned with soap and water, the carpet responds readily to shampoo treatment. Spots can be cleaned at home.

When cleaned and stored, the new carpet will need no special protection from moths. Nylon does not attract these destructive pests. Pre-shrunk, these carpets are manufactured by the Nye-Wait Company of Auburn, N. Y.

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NUTRITION

Revise Nutrition Yardstick

Daily allowances lower for sedentary workers, but protein recommendations remain unchanged. To study further the amount of thiamin needed.

➤ THE nation's nutrition yardstick got revised downward somewhat by the Food and Nutrition Board of the National Research Council meeting in Washington.

Daily calorie allowances for sedentary men and women, for example, are now 100 calories lower than the previous recommendations of this group. For the

individual man or woman this change seems small. It amounts to about one ounce less of sugar per day or about two less slices of bread. But when multiplied by the number of sedentary men and women in the population, the figure would amount to quite a contribution toward feeding the hungry world.

The point stressed by the board in



NYLON RUG FOR THE HOME—
It promises to be long-lasting, abrasion-resistant and easy to clean.

AGRICULTURE

Helicopters Used to Dust Wheat Fields with 2,4-D

➤ **HELICOPTERS** and airplanes were used to distribute weed-killing 2,4-D over wheat fields in the neighborhood of Dodge City, Kansas, Sunday, May 16. It was the first large-scale use of 2,4-D to kill weeds among the wheat ever undertaken in this country.

Special interest attaches to the use of helicopters for this work. Sprays released from airplanes elsewhere in this country have been partly wasted through drifting down the wind, and in the South a good deal of trouble was caused by the injury and killing of cotton plants by these unintended doses of the chemical. If the down-thrust of the helicopter rotors can make the 2,4-D spray "stay put," it may solve what has grown to be a major dilemma in weed-killing.

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PHYSIOLOGY

Smoking Produces Tremor In Fingers if You Inhale

➤ **SMOKING** even half a cigarette will make your fingers tremble—if you inhale. This was shown by experiments on 100 college students at Athens, Ga., of whom 50 were smokers and 50 non-smokers.

The smokers show more finger tremor as a result of the smoking than do non-smokers, Dr. A. S. Edwards, of the University of Georgia, who conducted the experiment, reports in the current issue of the *Journal of Applied Psychology*. This he attributes to the fact that the habitual smoker generally inhales. For non-smokers, the finger trembling went up 18%. For smokers the increase was 39%.

In another experiment, the students took eight puffs on a cigarette in a minute. Habitual smokers showed an increase of 84%. For the non-smokers, this time, it was noticed which inhaled and which did not. The inhalers among the non-smokers averaged 129% and for seven of these the average ran as high as 272.3%. Compare this with 9.9% for the non-smokers who did not inhale! Neither was any tremor increase noticed after the students had sat in a smoke-filled room, provided they did not do the smoking.

What causes the tremor? Is it the nicotine? To test this point, the students were given nationally advertised "de-nicotinized" cigarettes. Results were

practically identical as with the standard tobacco. But when cornsilk was used no increase in tremor resulted even after an hour of smoking. The cornsilk was smoked in pipes, because the students had difficulty in making cigarettes of it.

Dr. Edwards also tested out the claim made by some students that they should not be expected to go through a two-hour examination without a smoke. After two hours of deprivation of cigarettes, the finger tremor was measured. If there was any nervousness as a result of going without smoking it did not show up in trembling finger tips.

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NUTRITION

Rice-Eaters Susceptible To Hidden Hunger Diseases

➤ **RICE-EATERS** are more likely to suffer hidden hunger diseases than wheat-eaters, Dr. W. R. Aykroyd, director of the nutrition division of FAO, told the International Congress on Tropical Medicine and Malaria meeting in Washington.

The reason is not any deficiency in rice itself. Husked rice, Dr. Aykroyd said, is about as nourishing as other cereals in the same state. But processes between harvesting and eating of rice rob it of many of its nourishing substances.

Making a bad situation worse, the rice-eaters of the world depend much more heavily on rice for their chief food than wheat-eaters depend on wheat. Almost three-fourths (70%) of the total calories in the rice-eater's diet come from rice. This is just too much rice. Even if the rice is enriched or specially processed to contain thiamin and other vitamins, rice-eaters would still suffer from diet deficiency diseases.

They would be better nourished if they ate more meat, milk, eggs, and fish. Rice-eaters, however, are generally poor and live where the land is so densely populated that very little if any can be spared for cattle pasturage. So they are not likely to get more meat, milk and eggs in the near future.

An immediate practical way of improving their diet, Dr. Aykroyd suggested, would be to eat more fish, pulses, beans, vegetables, fruits, roots and tubers, rice polishings, food yeast and coconuts. The available supply of pulses, vegetables and fish could be increased in most rice-eating countries in a relatively short time.

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PALEONTOLOGY

Ancient Fossils Found In Pre-Flooding Surveys

➤ **SIXTY-MILLION-YEAR-OLD** fossils, dating back to the last days of the dinosaurs, are being turned up in quantity by scientists making surveys of areas that are to be permanently flooded when the new reservoirs now projected are completed. Thus far, 94 such reconnaissance surveys have been made in the Missouri river basin, and promising sites for digs by trained paleontologists have been marked for exploration before the waters rise.

Surface scrapings have turned up many fossil fragments of primitive horses, tapirs and lower primates belonging to the beginning of the Age of Mammals. Somewhat earlier, contemporary with the last of the dinosaurs, is the three-foot shell of a soft-shelled turtle, found on the Big Horn river near Shoshone, Wyo.

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ANIMAL HUSBANDRY

Famed Holstein Bull Dead; Sired 15,000 Offspring

➤ **RAG APPLE**, a famous Holstein bull credited with siring more than 15,000 sons and daughters through artificial insemination, is dead. A post mortem disclosed a small piece of wire in his intestinal tract.

Rag Apple was owned by the New York Artificial Breeders' Cooperative in Ithaca, N. Y. He had been in service for three years four months. Dairy specialists look for an increase in the production of thousands of dairy herds which boast descendants of the famed bull.

Had Rag Apple stayed in natural service during this period, his ability to transmit high production would probably have been limited to slightly more than 100 offspring, it is estimated.

Rag Apple's record is one that few if any bulls in the world have equalled. His reputation went far beyond state boundaries. One of the first questions of visitors from all parts of the country and abroad, was always sure to be, "Where's Rag Apple?"

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E FIELDS

AERONAUTICS

Track-Tread Landing-Gear Permits Use of Soft Field

➤ TRACK-TREAD landing-gear on a heavy airplane made successful take-offs and landing on an unimproved runway at the Idlewild International Airport, New York. The track-gear performs the same function as the belt-like tread on a tractor or tank, thus spreading the weight of the plane over a greater area.

The plane equipped with the track-tread gear was a Fairchild Packet grossing 54,000 pounds. It was the first of its size to be supplied with this landing gear. This twin-engine cargo transport was chosen for the test because it was originally designed to operate in and out of short, unimproved airstrips.

The 14-inch-wide ribbed track on the steerable nose gear in the tricycle installation on the plane, and 19-inch-wide tracks on each main gear, were designed by Firestone Tire and Rubber Company. They are single-piece belts made of rubber reinforced with steel cables.

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MEDICINE

Worm Disease Causes Fits Like Those in Epilepsy

➤ A WORM disease that can cause fits like those in epilepsy and which may be mistaken for epilepsy or some mental trouble was reported by Lieut. Col. W. H. Hargreaves, medical liaison officer of the British Joint Services Mission, to the International Congress of Tropical Medicine and Malaria meeting in Washington.

The disease is called cysticercosis and is caused by the larval form of pork tapeworm. When the larvae get into the body they are surrounded in time by calcium. These hard lumps or cysts may be found anywhere in the body. They can sometimes be seen under the skin. When they get in the brain they may cause fits.

The condition may occur here in the United States or in any other country where pork tapeworms are found, Col. Hargreaves said. He and Dr. H. B. F. Dixon screened every British Army veteran reported to have fits and found

more than 300 of them had worm cysts in their brains. Most of the men had seen service in India and apparently picked up the worm larvae there through contaminated food or drink.

Individual worm cysts can often be located with X-rays and removed, even from the brain. But since there are usually many of the cysts, this treatment is not very practical. Some patients who were going blind because of the cysts were helped by a decompression operation.

The disease has a low death rate, eight percent, and very few of the surviving patients show any signs of the disease getting worse. More than a third are improving and one-sixth, approximately, have recovered.

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HORTICULTURE

Pollen-Hoarding Tomato Makes Hybridizing Easy

➤ HYBRID tomatoes, with all the advantages of size, quality and abundance that go with hybrid production, are brought nearer to American tables by the discovery, at the West Tennessee Experiment Station, of a tomato plant that is unable to shed its pollen. Its significance is discussed in *Science* (May 14) by Dr. W. E. Roever.

In breeding hybrid strains of plants, it is desirable to have the female or fruit-producing individuals "male-sterile," that is, incapable of being fertilized by pollen from its own flowers. As a rule, such male-sterility is due to the production of defective pollen, or even of practically no pollen at all. This, however, imposes a handicap in that it is difficult to keep the parent line going on what few grains of good pollen can be found.

The tomato plant which Dr. Roever discovered, however, does produce good pollen, and plenty of it. But the pollen sacs at the ends of the stamens simply fail to open, so that under natural conditions in the field there is no chance for self-pollination. The parent line can be kept going with pollen artificially extracted. In the field, hybridization is assured with pollen from a different line.

This pollen-hoarding tendency is a hereditary character, capable of being transferred to new lines of tomato plants by suitable breeding procedure. Dr. Roever estimates that it will save about 75 per cent of the labor involved in hybridizing.

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AGRICULTURE

Four Researchers in Agriculture Get Award

➤ FOUR leading research workers of the U. S. Department of Agriculture were presented with certificates of the Department's Distinguished Service Award, at a ceremony attended by many of their colleagues.

Those honored are:

Philip V. Cardon, Bureau of Plant Industry, Soils, and Agricultural Engineering, Beltsville, Md., "for outstanding service and exceptional leadership in the advancement of agricultural science."

Dr. John I. Hardy, Bureau of Animal Industry, Beltsville, Md., "for his imagination and persistence in inventing and constructing altogether new devices for measuring important qualities of wool and other fibers."

Frederick D. Richey, Bureau of Plant Industry, Soils, and Agricultural Engineering, stationed at the Agricultural Experiment Station, University of Tennessee, Knoxville, "for outstanding service in organizing and leading the co-operative corn breeding program which gave hybrid corn to American agriculture."

William D. Smith, Grain Branch Office, Production and Marketing Administration, New Orleans, "for outstanding service to agriculture and rural life through the invention of a machine for testing milling quality of rough rice and the development of rice standards."

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PHOTOGRAPHY

Newly Patented Camera Uses Two Films at Once

➤ SNAPSHOTS can be taken either in color or in black-and-white with the same camera, simply by turning a knob; or any other combination of two different kinds of film can be used, in the invention on which Walter D. Teague of New York has received U. S. patent 2,439,112.

The trick is very simple. There are two film-exposing frames set back to back, with film-roll holders at either end. The entire setup is mounted in a pair of light-tight metal circles at either end, and a knob or key is provided to bring either frame into position behind the lens, as the operator may desire.

Rights in the patent have been assigned to the Eastman Kodak Company.

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ASTRONOMY

Jupiter Shines All Night

Mars and Saturn are the two other planets visible during June. The summer solstice, which will come on June 21, will mark the beginning of the summer season.

By JAMES STOKLEY

➤ **ALTHOUGH** the brightest planet of recent months is about to disappear from the evening skies, three others remain visible, along with the stars that accompany the beginning of summer.

All during the spring Venus has shone brilliantly in the west after sunset, and at the beginning of June it can still be discerned, about 22 degrees above the horizon as the sun goes down. However, it is rapidly drawing into line with the sun, reaching that position (called inferior conjunction) on June 24. A number of days before this it will be lost in the sun's glare. By mid-July it will have passed to the west of the sun, so that it will rise about two hours before sunrise, thus changing to a "morning star."

At the very beginning of June one may also glimpse the innermost planet of all—Mercury—in the west as twilight gathers. On May 28 it will be farthest east of the sun, so that it will set the longest time after sunset, and for perhaps a week after this date it can be seen at dusk near the horizon. It reaches inferior conjunction with the sun less than a day ahead of Venus.

Jupiter in Opposition

Brightest planet that is visible throughout the month of June is Jupiter, in the constellation of Sagittarius, the archer. This orb is at opposition with the sun on June 15. That means that it is in the opposite direction, and rises at sunset, remaining visible through the night. Because, at this position, the earth is on the same side of the sun as that planet, it will then be closest, with a distance of 395,800,000 miles, accounting for its brightness. On the astronomer's scale, it is of magnitude minus 2.2. Its position is indicated on the accompanying maps, which depict the skies as they appear at 11:00 p.m. (daylight saving time) on June 1 and an hour earlier at the middle of the month. Jupiter is in the southeast, above the curved tail of Scorpio, the scorpion, a group marked by the red star called Antares.

The other two planets are seen in the west, close to the star Regulus, in Leo, the lion, which stands at the end of the handle of the sickle, a hook-shaped group of stars. Mars, Regulus and Saturn stand in a row, reading from east to west. Saturn is brightest of the trio, Mars second and the star the faintest.

In addition to Regulus and Antares, seven other stars of the first magnitude are shown. Brightest is Vega, standing in the east in the figure of Lyra, the lyre. Below is the northern cross, which is part of Cygnus, the swan, resting on its side, with the star Deneb at the northern end. To the right is Aquila, the eagle, with Altair as the brightest star.

Directly overhead you can see the constellation of Bootes, the bear-driver, which is marked by the star Arcturus. Below this group, and to the left of Leo, we find Virgo, the virgin, of which the brightest star is Spica. The remaining pair of bright stars are low in the northwest, their proximity to the horizon making them seem much fainter than normal, however. One is Pollux, almost all that remains visible of Gemini, the twins, and the other, farther north, is Capella, in Auriga, the charioteer. Earlier in the evening these appear a little higher, while later they have gone below the horizon.

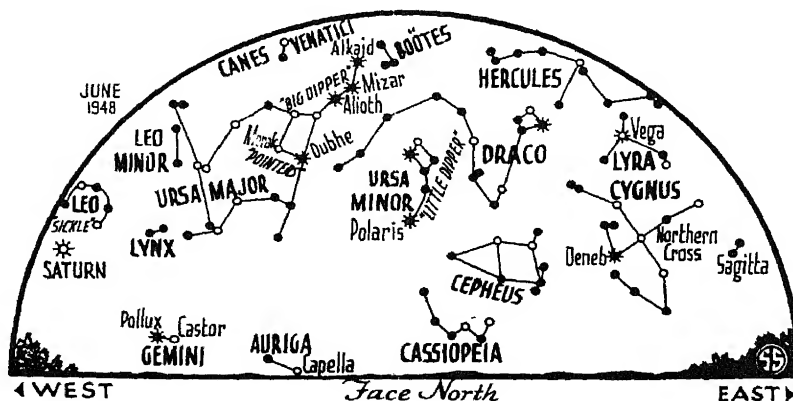
One astronomical event of June comes on the 21st, at 8:11 a.m. EDT. This is the summer solstice. Ever since last

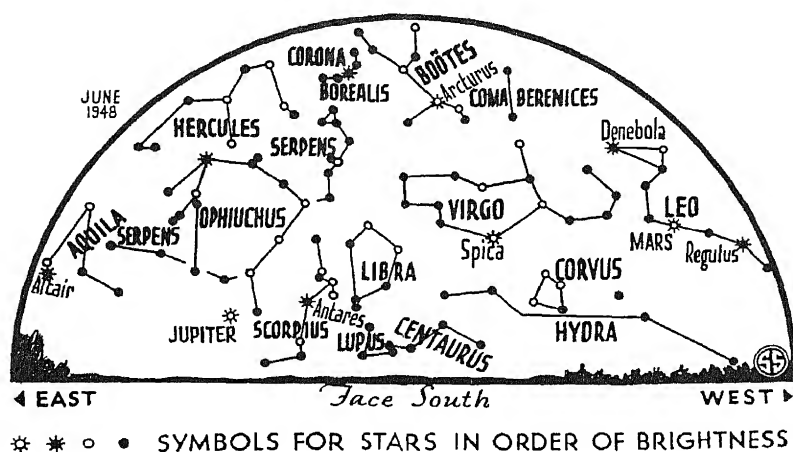
December the sun has been moving northward in the sky, the solstice marking the limit. In the northern hemisphere this is the beginning of the summer season, while in southern countries it is the first day of winter.

The planet Jupiter, closest to the earth on June 15, is by far the largest in the solar system—in fact, it is bigger than all the other planets together. With a diameter of 86,700 miles, or nearly 11 times that of the earth, it has more than 1300 times the earth's volume. However, its mass is only some 300 times that of our home planet, which means that it is much less dense, on the average. Although it is so big, it rotates far more rapidly than our planet, for it turns on its axis once in 9 hours 55 minutes. This is so rapid that the equatorial regions move at a speed of 25,000 miles an hour. Thus there is considerable centrifugal force, tending to throw these regions farther from the center, so that the diameter measured at the equator is about a fifteenth greater than that from pole to pole.

Red Spot Persists

The surface of Jupiter that we see in a telescope shows characteristic markings in the form of red and brown bands. There is one large red spot that has persisted, on and off, for more than a century. The changes in detail show that this is not a solid surface, but of clouds. With Jupiter so far away from the sun, however, these are not clouds of water, like those we see on Venus. The work of Rupert Wildt, now of Yale University Observatory, has indicated that they are clouds of frozen gases—





◀ EAST Face South WEST ▶
 ☆ * ○ • SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS

methane and ammonia. This theory has been confirmed by laboratory experiments.

Passing light through a long pipe containing these gases, then analyzing the light through the prisms of a spectroscope, dark bands are seen in the colored spectrum on account of the fact that certain wavelengths have been absorbed. Observations at the Mt. Wilson Observatory have shown the same bands present in the light reflected from Jupiter, proving beyond doubt that these gases are present. The colors in the clouds seem to come from compounds of metals such as sodium or potassium.

Since there are good reasons for believing that the ratio of density in Jupiter from the center to the outer part is much greater than in the earth, it seems that there must be something solid under the atmosphere. Dr. Wildt has pictured it as having a core 36,000 miles in diameter, of iron and rock, with a density of about six times that of water. Around this he assumes an ocean of compressed ice (density about 1.5) perhaps 20,000 miles deep. Around this is a layer of hydrogen and other gases, 6,500 miles thick, also compressed to a density a quarter that of water. The clouds of ammonia and methane form the outer skin.

Has Most Moons

As far as we know, Jupiter is the best provided of all the planets when it comes to moons, for 11 have been observed. There are four large ones which were discovered by Galileo in 1610—the first astronomical discoveries to be made with the then newly invented telescope. Possibly he was anticipated by a German astronomer, Simon Marius, who observed them a few months earlier, though there seems to be some

doubt as to whether Marius realized that they were stars in the same direction. This was Galileo's first opinion, but it was dispelled after he observed them for a few nights and found that they moved along with the planet, encircling it as they traveled. The names which Marius proposed for them—Io, Europa, Ganymede and Callisto—are still used today. Two are larger than our moon, that of Ganymede being 3,270 miles and Callisto 3,140 miles. (The moon's diameter is 2,162 miles.)

Lick Discovery

An American astronomer, Edward E. Barnard, discovered the fifth satellite of Jupiter in 1892 while looking through the great telescope at the Lick Observatory. It is the innermost of all, with a diameter of about 150 miles. It was at the same observatory, in 1904 and 1905, that Dr. C. D. Perrine discovered photographically (as were all the rest) the sixth and seventh, which are next out from Galileo's quartet, and have diameters of 100 and 35 miles respectively. An astronomer named Melotte, at the Greenwich Observatory in England, found the eighth in 1908. Its diameter is only about 35 miles.

In 1914 Lick Observatory scored again, when Dr. Seth B. Nicholson found number nine, the diameter of which has been estimated at 17 miles. By 1938 he had become a distinguished member of the staff of the Mt. Wilson Observatory, and was taking photographs with the 100-inch telescope to record his 1914 discovery. On these plates he found two star-like objects which seemed to be travelling along with Jupiter. Further observation proved that they really were satellites, and they are numbered ten and eleven. Their diameters seem to be about 15 and 19

miles. Their orbits around Jupiter are between those of satellites five and eight. Perhaps there are still more, which will be found on future photographs.

Time Table for June

June	EDST	
7	8:55 a. m.	New moon
8	6:50 p. m.	Moon passes Mercury
9	12:24 a. m.	Moon passes Venus
10	3:00 p. m.	Moon nearest, distance 227,600 miles
11	1:18 p. m.	Moon passes Saturn
13	3:45 a. m.	Moon passes Mars
14	1:40 a. m.	Moon in first quarter
15	3:00 p. m.	Jupiter nearest, distance 395,800,000 miles
20	8:31 p. m.	Moon passes Jupiter
21	8:11 a. m.	Sun farthest north, summer commences
	8:54 a. m.	Full moon
23	11:00 p. m.	Mercury in line with sun
24	10:00 a. m.	Venus in line with sun
26	9:00 a. m.	Moon farthest, distance 251,700 miles
29	11:23 a. m.	Moon in last quarter

Subtract one hour for CDST, two hours for MDST, and three for PDST.

Science News Letter, May 22, 1948

Dry ice was found successful in creating an artificial snowstorm when sprinkled by plane in a super-cooled cloud a year ago; now 15 different types of finely-divided soil have been found to be capable of producing *snow* in the laboratory.

The world's first successful *liquid-fuel* rocket was fired 22 years ago.

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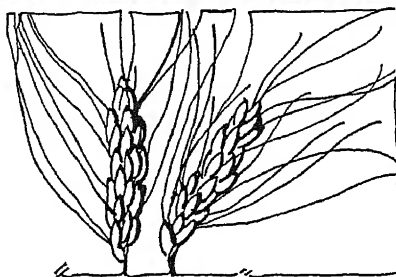
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Yet ecologically speaking most of the crop plants they nurse so tenderly behave very much like weeds. One of the reasons why weeds prosper so annoyingly on cultivated land is that they and their cultivated rivals like exactly the same soil and moisture conditions: good, loose tilth (which means a disturbed soil), and neither too much nor too little moisture.

A great many of our cultivated plants which are known in the wild state look like weeds and for all practical purposes are weeds. They do not compete successfully with the stabilized populations of grasses and other herbs that form meadows and prairies, and they cannot thrive in the shade of woodlands, or even brushlands. They like the open, slipping, eroding soils of steep hillsides, or the often-disturbed floodplains of streams.

To take a few random samples: The wild form of wheat is a hill plant in Asia Minor, and wild oats grow in similar locations in North Africa. Wild potatoes are plants of the open on the west coast of South America, and wild tomatoes belong to the jungle-edges farther east on the same continent. Nobody has ever seen wild corn, but a shrewd guess puts its probable habitat (if it still survives) on the "wrong side of the Andes." Wild tobaccos grow on the uneasy soils of tropical American mountains.

There is further evidence in the habits of cultivated plants that have reverted to the wild. Wild lettuce and wild chicory are weeds of vacant lots, trash dumps and neglected roadsides. Wild carrot has become the familiar weed, "queen's lace", that flourishes in abandoned fields, and has to be fought hard in cultivated ones. In California, wild oats grow on open soil in open places, as does also that plant reminiscent of the Biblical parable, wild mustard.

All these once cultivated species that have "gone native" thrive so long as they have no close competition, or when the only competition is that of cultivated plants in loose soil. If their habitats are left undisturbed and become stabilized with a good, solid sod, they become less numerous and as a rule ultimately disappear.

Science News Letter, May 22, 1948

CHEMISTRY

2,4-D Increases Yield Of Turpentine and Rosin

➤ MORE efficient extraction from Southern pines of the gum that yields turpentine and rosin is promised through a 2,4-D treatment developed by C. E. Ostrom and C. S. Schopmeyer of the Southeastern Forest Experiment Station, Lake City, Fla. They have dedicated U. S. patent 2,435,724, recently issued on their discovery, to the American public for its free use.

The treatment consists simply in spraying the cuts made through the bark of the trees with a dilute solution or suspension of 2,4-D or one of its compounds. In tests conducted there, yields from treated trees were from two to seven times higher than those from similar trees that were merely slashed and not sprayed.

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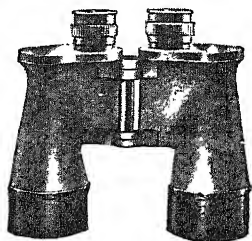
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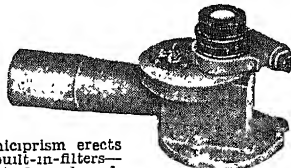
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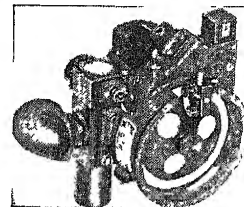
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ANTHROPOLOGY: Race, Language, Culture, Psychology, Prehistory—A. L. Kroeber—*Harcourt, Brace*, Rev. ed., 856 p., illus., \$7.50. A text also of interest to the layman who wants to know more of man's early history.

BIOGRAPHY OF THE EARTH: Its Past, Present and Future—George Gamow—*New American Library*, 194 p., illus., paper, 35 cents. A beautifully readable and engagingly illustrated book by a well-known scientist. Reprint of a book originally published by Viking but revised somewhat to bring it up to date.

CHEMICAL RUSSIAN, SELF-TAUGHT—James W. Perry—*Journal of Chemical Education*, 221 p., \$3.00. The author believes it is not so difficult as you think provided

you give up the idea of finding exact English equivalents of all Russian words. Alphabetical glossary included.

CHYMIA: Annual Studies in the History of Chemistry, Vol. 1—Tenney L. Davis, Ed.—*University of Pennsylvania Press*, 190 p., illus., \$3.50. Selections from the Edgar Fahs Memorial Collection of rare books, manuscripts and prints relating to chemists and their works.

FUNDAMENTAL PRINCIPLES OF BACTERIOLOGY—A. J. Salle—*McGraw-Hill*, 3d ed., 730 p., illus., \$6.00. For beginners in the study of bacteriology, but especially those who intended to specialize in the field. Revised and expanded.

FURTHER EXPERIENCE WITH THE RANGE FINDING TEST IN THE INDUSTRIAL TOXICOLOGY LABORATORY—Henry F. Smyth, Jr., and Charles P. Carpenter—*Mellon Institute*, 6 p., paper, free if requested direct from the publisher at the University of Pittsburgh.

ISOMERISM AND ISOMERIZATION OF ORGANIC COMPOUNDS—Ernst Davis Bergmann—*Interscience*, 138 p., \$3.50. Six lectures delivered in the United States in 1946 by the director of the Weizmann Institute of Science in Rehovot, Palestine.

MARRIAGE FOR MODERNS—Henry A. Bowman—*McGraw-Hill*, 2d ed., 544 p., illus., \$5.00. A text which developed out of the course on marriage at Stephens College.

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STRENGTH OF MATERIALS—Joseph Marin—*Macmillan*, 464 p., illus., \$4.75. Text for a first course in this subject.

VICTOR ROBINSON MEMORIAL VOLUME, ESSAYS ON HISTORY OF MEDICINE: In Honor of Victor Robinson on His Sixtieth Birthday, August 16, 1946—Solomon R. Kagan, Ed.—*Froben*, 447 p., illus., \$10.00. The tribute of 38 authors to a leader in their field. Edition limited to 350 copies.

WORLD HEALTH ORGANIZATION—PROGRESS AND PLANS—H. van Zile Hyde—*Department of State*, 23 p., paper, free upon request direct to U. S. Department of State, Washington 25, D. C. Includes text of the constitution of WHO. This is the first specialized agency of the United Nations of which the U. S. has not been a member at the time of entry into force of its constitution.

Science News Letter, May 22, 1948

SEISMOLOGY

New Earthquake Indicator Records at Distance

➤ A SEISMOGRAPH, or earthquake-recording instrument, of radically new type has been developed at Harvard University by a graduate student in geology, Roland K. Blumberg of Seguin, Texas. Instead of writing the squiggly line that is a distant earthquake's signature by a dancing dot of light on a sheet of photographic paper, it translates the impulses into electrical terms, thereby making it possible to install the recording end of the setup at any convenient distance from the wave-detecting mechanism, and to have the record made by a fountain pen on a strip of ordinary paper.

Whereas in existing seismological equipment it is necessary to have three instruments oriented on three axes—north-south, east-west and vertical—to make a complete record of the shape of an earthquake's waves, with the new design a single instrument suffices for all three. It drives three pens on the recorder, thus making a simultaneous triple record of every earthquake.

First installation of the new instrument has been made at the University's observatory at Harvard, Mass., Prof. Don Leet announces. The first major disturbance that was registered on its paper tape was the disastrous Philippine earthquake of Jan. 24.

Science News Letter, May 22, 1948

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AERONAUTICS

International Aviation Aided by New Standards

➤ WORLD-WIDE civilian air transport services will be safer and easier with the adoption in Montreal of five sets of standards by the Council of the International Civil Aviation Organization for the 47 nations, including the United States, represented in the association.

The standards approved include the licensing of pilots and crews, uniform aeronautical maps and charts, rules of the air, dimensional practices and meteorological codes. They have been sent to the member nations for consideration and it is hoped will be enacted into the legislative codes of each.

The first standard lays down the technical requirements and experiences necessary for pilots, navigators and air crews flying international routes. The second will assure maps and charts which all pilots and navigators will be able to use no matter where they may be. The third, the rules of the air, include general flight rules and right-of-way rules. They are the equivalent of road rules for ground motor vehicles.

The rules for dimensional practices are intended to do away with the present confusion caused by the use of both metric and foot-pound-second units in air-ground communications. The meteorological codes specify the various agreed systems used for the transmission of weather information.

Science News Letter, May 22, 1948

ELECTRONICS-AERONAUTICS

VHF Radio for Small Planes Transmits in Bad Weather

➤ NEW small radios for private planes that permit communication with airports in all types of weather were revealed by General Electric. They have an effective range of 50 miles over level terrain from an altitude of 5,000 feet.

The radio transmitting set, weighing less than three pounds is able to get a message through under bad-weather conditions because it operates at frequencies ranging from 121,500 to 122,900 kilocycles, relatively unaffected by thunderstorms and other climatic conditions. It uses less than one-tenth the power of a conventional private-plane transmitter, and is designed to take advantage of the six radio frequencies recently allocated by the Federal Communications Commission for personal planes.

Science News Letter, May 22, 1948

● Special Pre - Publication Offer to Readers of Science News Letter

THE method of rhythmical design presented by Joseph Schillinger links together on a mathematical basis music, design and all the graphic arts. In his method, Schillinger reveals the fundamental mathematical laws of structure underlying plant and animal life, and the applications thereof in the art forms of developed cultures of the past. In my opinion his achievement is a genuine and valuable contribution to the study of esthetics and to art education. Because the laws which he formulates are mathematically fundamental, Schillinger's method is applicable not only in the analysis of existing works of art and of musical compositions, but offers a definite and workable procedure for architects, painters, composers, sculptors, and designers in the industrial fields.

"While in no way interfering with or limiting the imagination and feeling of the artist, it replaces the 'trial and error' method with one that is logical, easy of application, and as precise and sound as the structure of nature itself."—*Prof. C. J. Martin, Teachers College, Columbia University.*

"ESTHETIC realities, states the original and intriguing mathematician, Joseph Schillinger, are in no way discontinuous with physical realities. Schillinger possesses for his affirmations and prophecies a base in technology and artistic experience. Bertrand Russell announces the gospel and Schillinger designs and constructs the machinery of its applications."—*Dr. Horace M. Kallen, Art and Freedom.*

THE MATHEMATICAL BASIS OF THE ARTS

By Joseph Schillinger

"THE AUTHOR'S goal is, in his own words, 'to disclose the mechanism of creatorship as it manifests itself in nature and in the arts.' We are convinced he has achieved that goal. All the arts, like Architecture, must be built. And toward their building—perhaps as a guide in their planning and certainly as a corrective of their creator's mortal error of execution, a knowledge of the MATHEMATICAL BASIS OF THE ARTS is of profound importance."—*Rockwell Kent.*

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• New Machines and Gadgets •

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☛ **SAFETY RAIL** for the bathtub fits anywhere crosswise in the tub, gripping the sides firmly enough to support a considerable weight. This chrome-plated brass rod, designed to fit all standard bath tubs, is easily and quickly installed by merely opening or closing two adjusting nuts.

Science News Letter, May 22, 1948

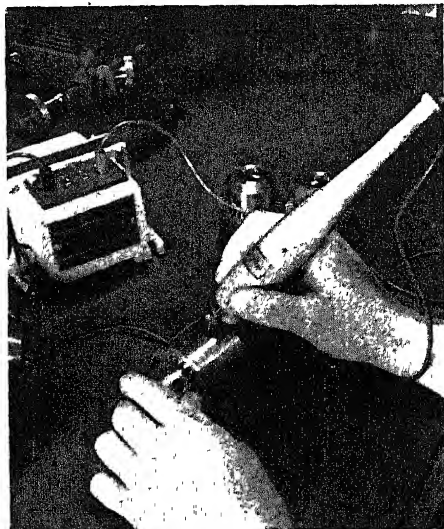
☛ **APPLE PRESERVER**, a machine for purifying the air in storage chambers, is claimed to add four to six weeks to storage life. By means of a motor and fan, it draws the air through a filter of activated carbon to remove ethylene, which accelerates ripening, and the "scald" which causes brownish discolorations.

Science News Letter, May 22, 1948

☛ **FERTILIZER UNIT**, for applying liquid food to lawns and flowers, is a metal coupling to attach between faucet and garden hose which has a suction tube on one side. When the end of this tube is stuck into a pail of a fertilizer solution, the liquid is drawn up and into the hose stream thus delivering "enriched" water to the plants.

Science News Letter, May 22, 1948

☛ **ELECTRIC PENCIL**, which writes on steel in six different grades of writing strength, is a British device which operates on a system of magnets causing



vibrations of a spring and the needle. It operates on a battery or with a special light transformer. The picture shows it writing on a steel chuck.

Science News Letter, May 22, 1948

☛ **GOLF BALL**, claimed to rebound 20% higher when dropped 20 feet than other balls in the same price class, owes its increased resiliency to the better quality transmitting liquid used in it. The ball permits the use of shorter clubs which, in turn, assure better control and, therefore, fewer strokes.

Science News Letter, May 22, 1948

☛ **MOISTURE-ABSORBER** chemical, a harmless, tasteless material when eaten, will keep salt free-running from the shaker in the most damp climates. When sprinkled in the bottom of a cookie jar, it will keep the cookies crisp and tasty, and it can also be used to protect goods in storage from dampness.

Science News Letter, May 22, 1948

☛ **BRAKE-MASTER**, for insertion in hydraulic brake pressure line in automobiles between the so-called master cylinder and the brakes themselves, provides automatic adjustment of the brakes to compensate for brake lining wear. It is made of die-cast aluminum with a brass cylinder insert for added strength.

Science News Letter, May 22, 1948

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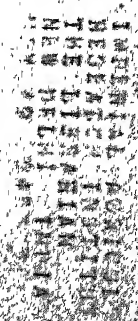
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SCIENCE NEWS LETTER

Vol. 53, No. 22

THE WEEKLY SUMMARY OF CURRENT SCIENCE • MAY 29, 1948

27 JUL 1948



Death To Pests

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A SCIENCE SERVICE PUBLICATION

PSYCHIATRY

10-Minute Brain Operation

Sharp, slender instrument is driven through bony part of eye socket and then swung in arc. Succeeds with third of schizophrenics.

➤ A SAFE, simple, 10-minute operation that is restoring mentally sick people to health and sanity was announced by Dr. Walter Freeman of Washington at the meeting of the American Psychiatric Association.

Combined with electro-shock treatment, it succeeds in one-third of the schizophrenia patients and one-half of those suffering involutional mental disorders. These last are patients suffering depressions and other abnormal mental states due to severe emotional disturbance at or just after mid-life.

In the operation Dr. Freeman drives a sharp, slender instrument through the bony part of the eye socket into the front of the brain. The instrument is then swung through an arc of 30 degrees and withdrawn. The same operation is performed on both sides.

The patient is first given two electro-shock convulsions at one- or two-minute intervals. Then, while he is still unconscious, the operation is swiftly performed. No anesthetic is needed. And since the eye socket area is normally germ-free, and the tears flow freely after electro-shock, no sterilizing of the area with antiseptics is needed.

Within an hour after the operation some patients are able to get out of bed, talk, swallow liquids and perform simple activities. In favorable cases, patients have returned to their former jobs or occupations within two weeks and have continued to maintain themselves satisfactorily.

One patient was observed chuckling to herself several times during the afternoon after the operation. When asked why she was laughing, she answered:

"All those foolish ideas I had. How did I get them anyway?"

The operation does not succeed in all cases and some who were apparently helped by it have since relapsed. It was originally devised by an Italian surgeon, A. M. Fiamberti, in 1937. Early reports were not reassuring and then the war came and Dr. Freeman could get no further word about it. He decided to investigate it himself early in 1946. Since then he has performed the operation on 100 patients.

Its chief advantage over two other relatively new operations for relief of insanity is the fact that it is a minor operation which can be performed by psychiatrists in mental hospitals. The other two operations are: 1. Prefrontal lobotomy, in which a hole must be drilled through the skull and then brain connections severed. Dr. Freeman introduced this operation into the United States about 10 years ago. 2. Topectomy, a "formidable" operation in which certain parts of the frontal lobes of the brain are removed. This operation was announced in March of this year by Columbia-Greystone Associates.

The operation reported at the meeting is called transorbital lobotomy. Transorbital means through the orbit, or eye socket. Lobotomy means cutting into a lobe of the brain. The object of

both lobotomy operations is to cut the connections between the part of the brain Dr. Freeman calls the "dynamo" of the mental sickness and other parts of the brain.

The operation through the eye socket should succeed, Dr. Freeman said, in patients who have been sick less than one year and in the hospital less than six months. A few may recover after longer illness. In illnesses longer than one year's duration, transorbital lobotomy should be looked on as a test, not a last resort. If it brings improvement but the improvement does not last, the standard lobotomy operation should be performed.

The shape of the patient's head has some bearing on the success of the operation. A high, broad forehead, particularly with rather deep-set eyes, is the one in which the operation is most likely to succeed. This is because in such a shaped head a larger volume of the frontal lobe of the brain is within reach of the instrument. Failures have resulted in patients otherwise satisfactory whose foreheads were of the narrow, sloping character.

Science News Letter, May 29, 1948

AERONAUTICS

Super Wind Tunnel

For testing guided missiles and aircraft, it has air forced through it at speeds near 3,000 miles per hour, four times speed of sound.

➤ A SUPER-SUPERSONIC wind tunnel for testing guided missiles and aircraft has been dedicated at Aberdeen Proving Ground, Md. It has a perfectly-controlled flexible throat that permits quick changes in the supersonic flow of air through it.

Air is forced through the tunnel to create speeds approaching 3,000 miles per hour, four times the speed of sound at sea level.

Most wind tunnels have fixed throats, sections smaller than the main tunnel, that are responsible for stepping up the speed of the air. These can be changed in some tunnels only by removal and replacement.

The flexible throat wind tunnel has the advantage that its speed may be very quickly and easily changed from one supersonic velocity to another.

With this it is possible to cover a range of speeds from Mach number one

to Mach number four.

The change in the size of the opening in the throat is made by a series of jacks electrically operated whose movements can be kept perfectly aligned and controlled to an exceedingly small fraction of an inch. These jacks press on the chrome-plated flexible upper and lower sides of the throat.

This flexible throat affair, dedicated at the Army Ordnance Ballistic Research Laboratories, is not the only wind tunnel at this research center. There is particularly a fixed throat tunnel which, it is claimed, was the nation's first large-scale supersonic tunnel. A free-flight aerodynamics range has all sorts of instruments for the study of models in flight at supersonic velocities. The results are quickly computed on an electronic super-calculator, one type being the Eniac, which stands for electronic numerical integrator and computer.

Science News Letter, May 29, 1948

PHYSICS-MEDICINE

New Cancer Weapon

X-Ray telescope will give physicians a 500-times clearer view of internal organs. Will aid greatly in diagnosis of stomach cancer and heart ills.

➤ A NEW weapon for fighting stomach cancer, cause of nearly half the cancer deaths in the nation, has been developed by Dr. John W. Coltman, physicist at the Westinghouse Research Laboratories, Pittsburgh.

The new anti-cancer weapon is an "X-ray telescope." Used with standard X-ray fluoroscopic equipment now in hospitals and doctors' offices, it will give doctors a 500 times clearer view than ever before of their patients' internal organs.

One of the biggest blocks to the conquest of stomach cancer is the difficulty of diagnosing it in time for successful treatment. The new "X-ray telescope" is expected to aid in this important field.

Better diagnosis of heart ailments and other diseases may also come with the aid of the new instrument.

The X-ray telescope consists essentially of an electronic tube with a chain-

like reaction going on inside it. In the chain-like reaction, the X-rays passing through the patient's body first produce light rays. These in turn create electrons within the new tube. Then with the aid of powerful electrical forces the electrons are hurled across the tube at a speed of 5,000 miles per second and strike a fluorescent screen producing the image viewed by the physician. The speed-up of the electrons is the chief factor in brightening the final image.

"Greatly increased brightness will make possible a movie-like viewing of all internal organs and movements from any angle, a sharp contrast to the very dim view now possible with the best available equipment," Dr. Coltman explained. "No longer will the physician need long periods to adapt his eyes to darkness before viewing the X-ray screen, and even more important, he will be able to make rapid, accurate diagnosis of internal de-

tail never clearly visible before by fluoroscopic means.

"The 500-fold increase in brightness should put the image well within the range of present-day television pick-up tubes. This means that the fluoroscopic image may be transmitted and duplicated at different points for observation by more than one person or group. It is even conceivable that some day medical specialists hundred of miles from the patient can be consulted and aid in the instant diagnosis of an internal ailment."

The new instrument does not expose the patient or the physician to any greater amount of X-rays than are now used in diagnosis. This is an important safety advantage.

Science News Letter, May 29, 1948

PSYCHIATRY

Histamine Used to Aid Some Mental Patients

➤ DELUSIONS can be banished and some mental patients can be helped to recovery by histamine, a chemical believed to play a part in hayfever suffering, the American Psychiatric Association was told at its meeting in Washington.

Dr. E. O. Niver of Eau Claire, Wis., described the dramatic recovery from delusions of a 26-year-old man.

The patient had been depressed for some time. His father had committed suicide and the young man was convinced that he suffered from a hopeless condition. He had the delusion that part of his digestive tract was "dead and his food was wasted." This delusion showed immediate improvement when histamine treatment was started and within one week it had cleared up entirely. The patient's judgment, however, was still defective, so that he refused further voluntary treatment.

A stocky, mildly paranoid woman who was beset by suspicions that her husband was unfaithful was also helped by histamine treatment. Her suspicions made her agitated and her inner sense of hostility at times reached a dangerous pitch. After five injections of histamine with psychotherapy she became calmer, gained insight into her problems, and for several months has gotten along very well.

A 45-year-old woman with some tendency to depression came to the hospital because of excruciating, knifelike headaches. These were not due to nervous and muscular tension, nor to migraine. Sedatives failed to relieve them.

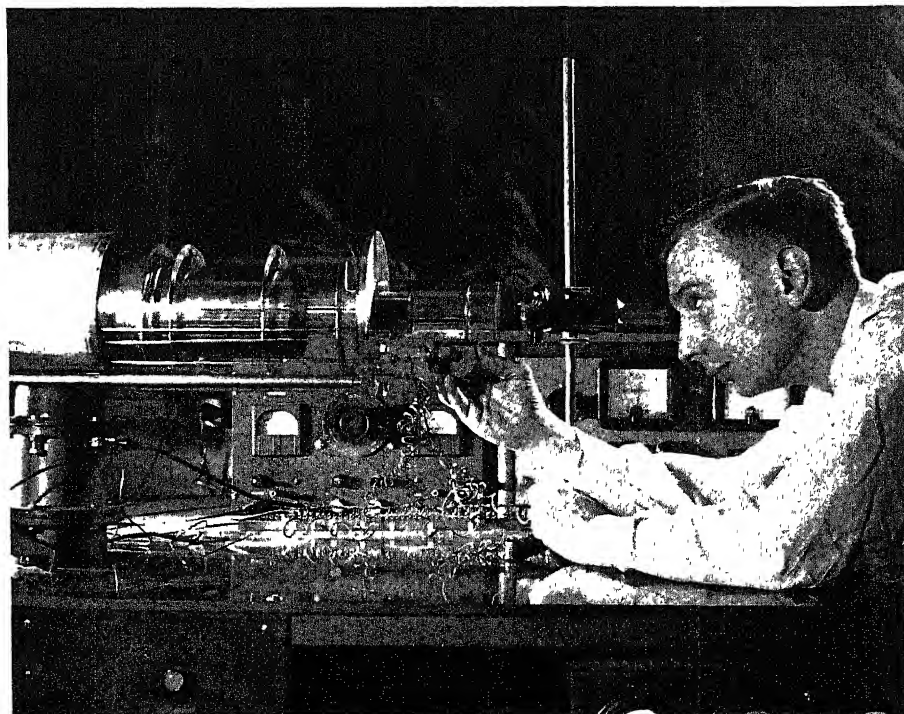


IMAGE BRIGHTENER—This device demonstrates that with a 500 amplification tube it would be possible to brighten X-ray images 500 times.

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and Agricultural Research Institute

She began to improve under histamine treatment. Then, one day, the drug caused her headache to become much worse. At that point she became very hostile and said some of the things she had been afraid to say before. After this her symptoms improved and she was able to deal reasonably with her problems.

The chief value of histamine, Dr. Niver thinks, is that it gives patients an increased sense of self-confidence without lessening their sense of power to control themselves. This makes it possible for them to probe with the psychiatrist into the underlying feeling conflict which is causing their illness. Many mental patients, Dr. Niver pointed

out, feel so unstable that they dread any psychiatric treatment. They fear that any "tampering with their psychological defenses" will drive them completely insane. Narcosynthesis helps in some of these cases, but some patients even dread the so-called "truth serum."

Dr. Niver turned to histamine as an aid in such cases because of the mutual antagonism between this body chemical and another, adrenalin, or epinephrine. The latter chemical can activate an anxiety that some psychiatrists say is an actual neurosis. So using its antagonist to help neurotic patients seemed logical. Histamine is a powerful chemical and must be used carefully, Dr. Niver warned.

Science News Letter, May 29, 1948

MEDICINE

Sulfa Drug For Cholera

Possibly future weapon against cholera, dysentery, and some other intestinal infections, phthalylsulfacetimide has saved lives of 97 out of 100.

A NEW sulfa drug that may be the weapon of the future against cholera, dysentery and some other intestinal infections was announced at the Congress of Tropical Medicine and Malaria meeting in Washington by Dr. Harry Seneca, research associate at Columbia University College of Physicians and Surgeons.

The drug is called phthalylsulfacetimide. It was developed by Dr. Seneca and Dr. Edward Henderson, director of clinical research of Schering Corporation. They were seeking a drug for dysentery and other similar infections that would be safe enough and cheap enough to be sold over the drug store counter like aspirin.

When the cholera epidemic broke out in Egypt last fall, tests of the new sulfa drug had progressed far enough so that the scientists thought it would have value in this disease. Dr. Seneca flew to Egypt in October with a supply of the drug.

Some 500 patients were treated. Because of the chaotic conditions and lack of trained personnel, adequate records could be gotten on only 43. But of these 43, only one died. That gives the new drug a record of saving lives at the rate of about 97 out of 100 in an epidemic in which almost 50 out of every 100 died. The drug's success in cholera, Dr. Seneca said, depends on its being given within the first three days of sickness.

The drug has been given to patients in the New York area suffering from ulcerative colitis and from acute intestinal inflammation. In the latter condition, some patients were relieved of symptoms in one day and all nine were cured on the fifth day. Of the 28 ulcerative colitis patients, 18 improved when given the drug. The drug is not expected to cure this condition, but to clean up secondary infection and give the ulcers a chance to heal.

Success of the drug and its safety are believed due to its unique ability to penetrate the walls of the intestines without being absorbed into the blood stream. It is given by mouth either in pills or in a powder dissolved in milk or water. It is not yet on the market.

Science News Letter, May 29, 1948

CHEMISTRY

New Glass Developed To Withstand High Heat

A NEW type of glass, which can be heated to 1,800 degrees Fahrenheit and rapidly cooled without breaking, was described to the American Chemical Society by Dr. Richard B. Ellis of the University of Miami. It is particularly suitable for sun lamps and laboratory glassware.

The new glass, called vycor and in-

vented by Dr. Martin Nordberg and Harrison Hood of the Corning Glass Works, consists almost entirely of silica. It is made from a soft, alkaline glass, molded or blown in the conventional way, which is then immersed in hot acid and the alkali dissolved and washed out. When the glass is heated to 2,000 degrees Fahrenheit, the pores close and it shrinks to about two-thirds its original volume.

The final product can be used continuously at a temperature of 1,600 degrees without losing its strength or clearness, Dr. Ellis stated. If heated to more than 1,800 degrees for prolonged periods, it becomes cloudy and opaque upon cooling. The opacity, however, does not affect the strength of the glass.

Science News Letter, May 29, 1948

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MEDICINE

Streptomycin Results Good

Hundreds of lives saved in first year's experimental use in treatment of tuberculosis. Not good for pulmonary type, which is most common.

➤ A YEAR'S experimentation with streptomycin therapy in tuberculosis has produced some "remarkable" results at Battey State hospital in Rome, Ga. The 650 patients treated are believed to constitute the largest group of tuberculosis patients to take the earthmold drug at any sanatorium in the United States.

"There is no doubt that streptomycin has saved and prolonged hundreds of lives," Dr. Rufus F. Payne, superintendent of the hospital, reported.

Of the 650 started on treatment, 523 have finished. Only 28 died. Of these, 26 were considered hopeless—the drug was given to relieve pain—so only two of these deaths represent failures of streptomycin.

But here is even more convincing evidence: Of the 523 patients treated, 106 have been discharged from the hospital, 90 of them improved, only 16 unimproved. Of the 106, doctors called 101 "far advanced" cases when the treatment was started.

And finally: 32 of those discharged, and now living normal lives at home, had been considered "absolutely hopeless" when admitted to the hospital!

Here are some of the facts established in the study:

1. The "new lesion" is the one which responds best.

2. The "biggest disappointment" is that the most common type of tuberculosis, pulmonary, shows the least response to the drug. Fortunately, Dr. Payne pointed out, there are other treatments for lung tuberculosis.

3. The "nicest thing" about streptomycin is that it works best on the types of cases for which doctors have never had any specific treatment.

4. This study has determined that half a gram per day is the best dose. Previously, one gram or 1.8 grams was the usual dosage. The patient is much less likely to become resistant at the lower dose, Dr. Payne said.

One of the most dramatic responses to streptomycin therapy has been miliary tuberculosis. This is a form spread by the blood stream into every organ of

the body. Normally, it's 100% fatal. Dr. Payne has tried it in about 25 cases, with apparent cures in more than three-fourths of them.

Meningitis is another complication bringing certain death. Thirteen cases have been treated at Battey, and seven of them are living. Two have survived more than a year, and are clinically well.

Kidney tuberculosis is one of the most painful forms. Surgery was the only treatment. Now streptomycin has been found to relieve the pain in at least 90% of the cases. It is hoped that 50% or more will experience permanent results.

Almost "miraculous" is the way Dr. Payne described the response in tuberculous laryngitis, another extremely painful form.

"Patients have been enabled to talk in normal tones, even though they had not spoken except in a whisper for three years," he said. "We have other patients who have not been able to swallow small

amounts of water. Within three weeks after they started taking streptomycin, they were eating a normal diet, completely free of pain."

Of the 650 patients treated so far, 388 have received their streptomycin without cost, thanks to a fund raised last year by public subscription. The appeal was made entirely through the newspapers, without one penny being spent for campaign expenses. The goal was \$75,000, but Georgains contributed \$111,815.

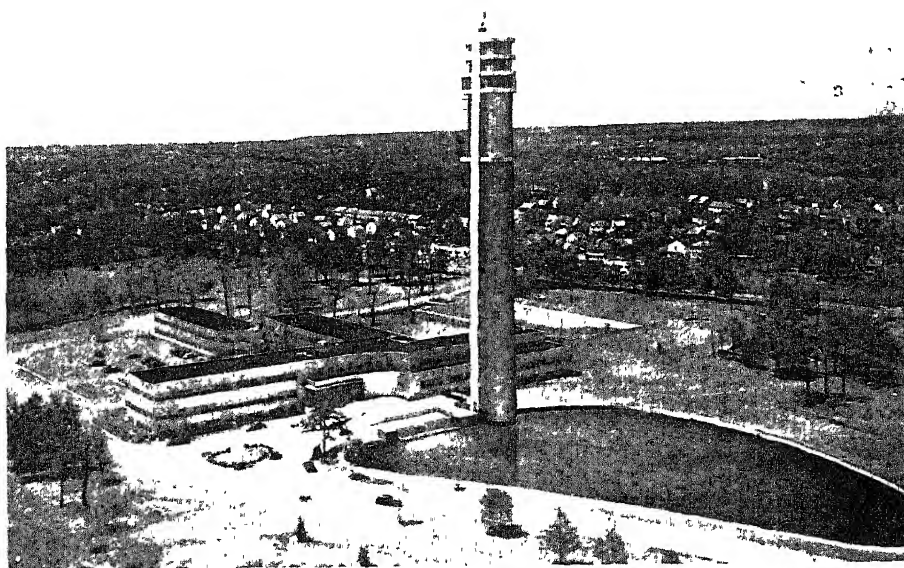
Science News Letter, May 29, 1948

RADAR

Two-Color Screens For Radar Scanners

➤ TWO-COLOR viewing screens, for use with radar scanning equipment to control aircraft traffic approaching airports, were revealed at the opening of the new 300-foot aluminum-sheathed tower for microwave experiments at Federal Telecommunication Laboratories, in Nutley, N. J.

An improved radar device to measure distances from moving planes to fixed ground beacons was also revealed. These are but two of important achievements here at the laboratories. The first is part of a navigation system being developed under contract with the Wat-son Laboratories of the Air Materiel Command, Red Bank, N. J. The second



TWO-COLOR RADAR—One of the projects being experimented with in this microwave laboratory tower at Nutley, N. J.

is part of the laboratory's work on a series of pulsed type radio aids to aerial navigation.

The two-color radar viewing screen aids control-tower operators to "see" better the airplanes in the 50-mile region surrounding the airport. The rotating antenna of this particular radar-scanner makes a complete revolution every second, turning from six to ten times more rapidly than older types. The result is that the detection and tracking of moving planes is made visually clearer.

The distance measuring equipment is an airborne radar device which provides constant and accurate measurement of distances from moving planes to fixed ground radio-responding beacons. It uses the so-called challenger-responder principle. Both the airborne challenger and the ground beacon have a pulsed transmitter and a receiver. The pulse sent out from the plane is received at the ground beacon and causes its transmitter to respond with a similar pulse. The distance is given on a dial in the plane computed automatically from the time required for the pulse to make its trip.

The new microwave laboratory tower resembles somewhat a lighthouse with a building on its top instead of the glass housing for the signal lights. It has a rigid steel frame which is sheathed in aluminum. At the top are three large enclosed landings for research purposes and several interior platforms for the installation of experimental microwave equipment.

Science News Letter, May 29, 1948

PHARMACY

Pain-Killing Drug To Be Available

► PATIENTS racked by chronic pain from causes other than cancer may soon have a new pain-killing drug to relieve their suffering.

The drug is metopon, an opium derivative which was released just a year ago for cancer patients only. A plan is now being considered for extending its distribution to other chronic pain sufferers. H. J. Anslinger, U. S. Commissioner of Narcotics, told the New York Academy of Sciences conference on analgesics.

If the new plan goes into effect, metopon will be available in drug stores on a physician's prescription. Its production and distribution, however, will still be subject to the Federal narcotic drug laws.

Science News Letter, May 29, 1948

PSYCHIATRY

Psychotics Have Defect

Blocking occurs between glands and central nervous system which is shown by blood tests made under stress. Changes occur in brain.

► MENTAL PATIENTS have a defect which blocks messages between the brain and nervous system and the glandular system in their bodies, a team of Washington University medical scientists reported to the American Psychiatric Association meeting in Washington. This may throw light on the fundamental nature of mental ills.

The scientists are Drs. Ernest H. Parsons, Ethel Ronzoni-Bishop, Sidney Hulbert and Edwin F. Gildea.

Counts of white blood cells and measurements of blood sugar gave the clue to existence of this defect. Unlike normal persons, the mental patients do not mobilize the sugar in their body in response to mental stress. Nor do they show the change in number of white blood cells shown in normal persons under stress.

The failures to show these measurable physical responses to mental stress were not due to defects of pituitary or adrenal glands, the scientists stated. Rather, they were due to a blocking of the communication system between the brain and nervous system and the glands that ordinarily respond to stress messages from the brain and nerves.

Changes in Brain

Definite changes in the brain, seen under the microscope, exist in the important mental disease labelled schizophrenia, Dr. N. W. Winkelman of Philadelphia and Dr. M. Harold Book of Norristown, Pa., declared.

Schizophrenia has sometimes been called a disease of split personality. Psychiatrists describe the patients as living in a dream world where they have sought escape from harsh reality.

Drs. Winkelman and Book, on the basis of their findings in 10 cases, contend that the disease should be classified as an organic rather than a personality disorder.

Where the disease exists under 40 years of age, they believe the changes in the brain cells are usually due to a biological susceptibility similar to the disposition of some bodies to tuberculosis. The early brain changes are slight and

similar ones have been found in the brains of normal people. This, the doctors believe, is what has led to psychiatrists' differing views on schizophrenia.

The situation, they pointed out, can be compared roughly to an automobile which develops a knock in the motor. The driver may think this merely an unusual noise but to the mechanic it is evidence of a burnt-out bearing.

Original Sin

The "original sin" which preachers and philosophers have talked about for centuries and for which they prescribed the antidote of love is probably a feeling of hostility, or hate, present in human infants months before they are born, the meeting was told.

Dr. J. C. N. Cushing of Baltimore offered this explanation. He told of seeing definite avoiding reactions in fetuses only 14 weeks old, or about six months before birth. The reactions were seen in moving picture studies of fetuses.

The avoiding reactions, he said, would be interpreted as hostile gestures in older individuals. They are evidence that hate, or hostility, is so primary an emotion that it has its genesis even before birth.

By the time the baby is born, it has stored up so much hostility, or hate, that for the rest of life it is faced with the problem which forces it constantly to seek affection to counterbalance the latent hostility.

Scare Stories Don't Harm

The "sensational press" is probably not doing any special harm to children and may even help some, Dr. Sophie W. Schroeder-Sloman, Chicago psychiatrist, declared.

Nervous, insecure children might actually be helped if reading crime stories in the newspapers made their nervousness so much worse that their parents finally noticed it and took them to a psychiatrist or mental health clinic. They needed such help anyway, but might not have gotten it if their anxiety and fears had not been aggravated to

the point where the parents saw it as abnormal.

Our children, she suggested, may have developed a certain immunity to horror stories as a result of their constant exposure to them by way of radio, comics and movies.

Her opinions were based on studies of children referred to the Chicago Institute for Juvenile Research in the wake of a highly-publicized kidnapping of a six-year-old girl, later found murdered and dismembered, which occurred in the heart of a middle class residential section of Chicago.

Six children, from seven to 11 years,

were brought to the Institute because they could not sleep or had bad dreams due to fear of kidnapping after reading newspaper accounts of the crime.

Without exception, Dr. Schroeder-Sloman said, all six children were insecure, had poor relationships with their parents, and could not trust them for protection. This easily explained their nervous condition.

Harder to understand, she said, was the lack of concern on the part of the majority of children in view of the tremendous amount of sensational publicity which had produced general anxiety in grown-ups.

Science News Letter, May 29, 1948

PSYCHIATRY

CO₂ As Mental Treatment

Patients inhale soda water gas and sleep, awaking relaxed and able to face their problems. Doctors took treatment themselves.

➤ CARBON DIOXIDE, the soda-water gas, is helping the mentally sick back to health, the American Psychiatric Association was told at its meeting in Washington.

The patients inhale the gas, mixed with oxygen. After 15 or 20 inhalations, they fall quietly into a deep slumber. Sometimes they dream. Sometimes not. When they wake up they are more relaxed and comfortable. And best of all, they can face their problems, talk them over with the psychiatrist, and win their way back to mental health.

Success with this treatment in 18 out of 37 patients was reported by Dr. J. A. Kindwall and five associates of the Milwaukee Sanatorium, Wauwatosa, Wis. There was no noticeable change in 11 and eight had their symptoms aggravated.

One patient who had been in a psychoneurotic depression for three years, with physical as well as mental symptoms, had 75 treatments and in five months was well. Another patient, with schizophrenic depression, became more tense under the treatments. They distressed her so that she was given only 15. She got well after electro-shock treatments given during insulin coma. But looking back she herself attributed much of her improvement and recovery to the carbon dioxide treatments. Whether she was right or wrong about this, her physicians do not know.

The patients who had pleasant or

neutral feelings with the treatment were helped, while those who were distressed or frightened by the carbon dioxide experiences were not.

Signs of addiction to the treatment appeared, even in patients who were distressed by it. Because they felt relaxed and more comfortable after each treatment, they often asked for more.

Several of the doctors took the treatments themselves. One took 97, averaging four a week with 30 to 40 inhalations of the gas each time. In about half the sessions he could recall no dreams but was aware that thoughts, mostly of daily events, were going through his mind. For the rest of the treatments he could recall dreams of a pleasant nature, often with romantic coloring. During one treatment he dreamed of an atomic bomb explosion but with no fear or unpleasantness.

"It was like a total dissolution, a pattern completed," he reported. He felt relaxed and comfortable during the dream. This dream occurred not long after one of his patients had a terrifying atom bomb dream while under the gas.

This doctor's personality did not change under the treatments, so far as he and his associates could tell.

Associated with Dr. Kindwall in the study of this new treatment were: Drs. Lewis Danziger, Ray Headlee, Carroll W. Osgood, H. Gladys Spear and Benjamin A. Ruskin.

Science News Letter, May 29, 1948



FOUR-SECOND CAMERA—The physician can read the record of a patient's heart almost as the beats are recorded. Shown at the camera is the inventor, Charles J. Glasser.

PHOTOGRAPHY

Camera Develops Film In Only Four Seconds

➤ A CAMERA which develops moving photographic paper or film four seconds after the picture is snapped has been developed for medical use.

Claimed to have the fastest complete developing process yet achieved, the new camera was built for medical work but may have applications in other fields of photography. The camera was successfully demonstrated by the Beck-Lee Corporation, Chicago.

Science News Letter, May 29, 1948

METALLURGY

Iron Powder Can Be Made More Cheaply

➤ HIGH-PURITY iron powder for chemical and metallurgical uses is made more cheaply than formerly in the process on which William J. Kroll of Niagara Falls, N. Y., has taken out patent 2,441,770. By this method, anhydrous ferrous chloride is reacted with anhydrous ammonia at a temperature between 500 and 675 degrees Centigrade, and the nitrided iron thus produced is then reduced, yielding pure iron, finely powdered.

Science News Letter, May 29, 1948

HORTICULTURE

Paint Weed Patches With 2,4-D, Is Advice

➤ PATCHES of weeds too close to flower beds or shrubbery to risk spraying with 2,4-D, for fear of harm to desirable plants, can still be killed with the toxic compound, L. W. Kephart of the U. S. Department of Agriculture suggests. Just spread the solution exactly where you want it with a paintbrush—being sure to clean the brush afterwards, and soak it for a day in a weak ammonia solution, before you touch any other plants with it.

Similarly, if you find a poison-ivy vine growing into your shrubbery, swab 2,4-D solution on its leaves with a brush, or a wad of cotton on the end of a stick, taking care not to get any on the leaves of your valuable bushes. You do not need to wet all the poison-ivy leaves; half-a-dozen of them will absorb enough 2,4-D to put the whole vine out of business.

Science News Letter, May 29, 1948

GENERAL SCIENCE

American Scientists Careful To Keep Military Secrets

➤ DECLARING that American scientists have done a good job keeping secrets, Dr. Edward U. Condon, director of the National Bureau of Standards, told the Washington Academy of Sciences that restriction of information requires a "delicate balance" between leaking military secrets and saving the benefits of a free exchange of scientific information.

Dr. Condon, who was called "one of the weakest links in our atomic security" in the report of a subcommittee of the House Committee on Un-American Activities, said that American scientists "have shown themselves singularly conscientious and discreet."

Pointing out that classification and security measures are needed now, the scientist warned against "unnecessary or needless regulations to hamper our progress."

Scientists, he urged, should not be treated either better or more suspiciously than any other group in personal investigations for loyalty or discretion.

"My own position has always been that I have nothing to conceal and if I have omitted to tell anything about myself it was either because I thought it was irrelevant or because I could not find anybody willing to listen," he said.

"A lot of the investigating that is going on today is in extremely incompetent hands and for that reason a waste of the taxpayers' money," Dr. Condon charged.

Stealing atomic secrets, he pointed out, would not be a simple spy job. The mere principles of modern science are complicated, while the valuable working secrets would be even more difficult to give away.

"I feel sorry indeed for any modern Mata Hari who might be assigned to get the secret of the atomic bomb by working her wiles on a young Army sergeant," Dr. Condon declared.

Science News Letter, May 29, 1948

ASTRONOMY-CARTOGRAPHY

Movies of Sun's Eclipse Aid in Improving Maps

➤ HOPES for better maps of the world through movies of the sun taken during the annular eclipse May 8 and 9 were raised high by receipt of good word from the project commander of two B-29's assigned to study the eclipse above the clouds.

Radio blackouts experienced over that week-end did not disturb receipt of the all-important time signals originating from the National Bureau of Standards' radio station in Washington. But they did keep from getting through the reports of "mission successful in every sense of the word."

If careful study of the eclipse photos confirms the complete success of the B-29 mission, it may make it possible for the first time to tie in the U. S.-Canadian geodetic survey networks directly with Asiatic systems. This is the judgment of Dr. Lyman J. Briggs, chairman of the National Geographic Society's Committee on Research. Differences in the times of second and third contact as observed from various points of observation is used to check on the longitude of the respective sites.

Unfavorable weather defeated observations at three of the five sites located on the Asiatic side of the Pacific to study the eclipse. Only the parties at Bangkok, Siam, and Rebun Jima, Japan, were successful.

Until the B-29's reported, the eclipse study had produced data for only a single map tie-in, that of Siam-Japan. Success of the Superforts may multiply that by three, for now the potential tie-ins promise to be Siam-Japan; Siam-Aleutians, and Japan-Aleutians.

Science News Letter, May 29, 1948

IN SCIENCE

PHOTOGRAPHY

Slow-Burning Film Developed for Movies

➤ A NEW slow-burning type of motion picture film base, developed by the Eastman Kodak Company, is claimed to be safer than the so-called safety film now used in home movies. It is described as a "high acetyl" acetate type, and it is intended to replace the cellulose acetate propionate base film.

It may also replace the cellulose nitrate film which is now widely used for professional motion pictures. It has proven satisfactory under tests of special prints of several feature pictures that were circulated through film exchanges in different parts of the country.

Nitrate film burns rapidly. Safety film generally is a slow-burning type. The low shrinkage of the new safety base will also keep the film free from buckle and the resulting in-and-out of focus images on the motion-picture screen. The new film has tensile strength comparable with the nitrate type and equal projection quality.

Science News Letter, May 29, 1948

WILDLIFE

Pellets From Shotgun Shells Kill Ducks They Miss

➤ LEAD SHOT that never hit any ducks may nevertheless be partly responsible for the present alarming decline in the duck population, suggests Vincent H. Reid of the Minnesota Division of Game and Fish, (*Journal of Wildlife Management, April*).

Gizzards of 1,084 wild ducks which were analyzed in his study contained lead shot in slightly over nine percent of all cases. The ducks had picked up the pellets along with their food from the shallow bottom mud. It is known that such gizzard pellets can cause more or less severe lead poisoning, which may affect the ducks' ability to reproduce if it does not kill them outright.

The problem of lead poisoning from spent shot is becoming more acute, Mr. Reid remarks, because increasing numbers of hunters are now shooting over Canadian and western waters where the main breeding grounds are.

Science News Letter, May 29, 1948

THE FIELDS

NUTRITION

Food Habits Important In Keeping the Peace

➤ TO HELP solve the problem of keeping the world healthy and peaceful, the World Health Organization needs to find out much more about the food habits of little children.

This is the opinion of Dr. Frank A. Calderone of New York, WHO official, who spoke at the Woods School research clinic conference.

Here are some of the things that Dr. Calderone finds we must know:

Is food something to be fought for? Or is food forced on the infant so that he gets too much of it?

Do children develop habitual hunger, with feelings of dissatisfaction and restlessness, due to supplementary foods being given so late in infancy?

What about weaning the baby—is this ruthless and aggressive or gentle and comforting?

Does daddy become a competitor in childish eyes because he is fed first at mealtime?

Are there dangerous stored-up hatreds created in a country where there is food shortage but a powerful and fortunate neighbor has enough to eat?

With such information, Dr. Calderone predicted that the virus of man's hatred for man can be conquered and the world made more peaceful.

Science News Letter, May 29, 1948

GENETICS-PSYCHOLOGY

Family Size Limit May Depend on Father

➤ THE father's ability to have children, rather than the mother's, is the chief factor determining the size of the family.

The discovery pointing to this was made in a study of 801 living pairs of twins 60 years old or more. This and other findings in the study were reported by Drs. F. J. Kallmann and G. Sander of the New York State Psychiatric Institute, Columbia University, at the meeting of the American Psychiatric Association in Washington.

News services, hospitals, welfare agencies and homes helped the scientists locate the twins for study. All the twins are residents of New York State.

The discovery that the father's ability to have children, or reproductivity, governs the size of the family comes from the finding that in males as well as in females, two-egg, same-sexed twins have greater reproductivity than one-egg, same-sexed twins. That this is true of male twins is a new discovery. It needs confirmation by more ample data, it was pointed out, before it can be taken as definitely establishing that the size of the family is chiefly governed by the father's reproductivity.

Celibacy was highest in one-egg female twins, due possibly to the psychological factors of their relationships and personality attitudes toward marriage.

Unexpected was the finding that sterility occurred in one partner of one-egg male twins twice as often as in two-egg male pairs. This, also, the doctors explain on a psychological basis. Marital disharmony, they point out, was found particularly common with one-egg male twins due to the unusually close relationship of the twin brothers.

Life cannot be extended beyond the optimum limit of any person's vital capacity, longevity studies of the twins showed. These studies are based on 58 pairs, both members of which have died of natural causes. The difference in the time one partner outlived the other was almost double between two-egg partners than that of one-egg pairs.

Science News Letter, May 29, 1948

METALLURGY

Low-Grade Iron Ore Up-Graded by Magnetizing

➤ IN ANTICIPATION of a time when it will be necessary to use lower-grade iron ores, a process for improving them by conversion from non-magnetic to magnetic state has been developed by Charles F. Ramseyer of Old Greenwich, Conn. It consists simply of grinding the ore to a fairly fine powder, then heating it for a few minutes in the presence of a reducing gas such as hydrogen or carbon monoxide, at a temperature between 500 and 1,000 degrees Fahrenheit.

About one-fourth of the iron in each particle is thus rendered magnetic, which permits the workable ore to be separated from the worthless mineral or gangue by passage (preferably in a wet condition) over a suitable electromagnetic device.

U. S. Patent 2,441,594 on this process has been assigned to H. A. Brassert and Company, of New York.

Science News Letter, May 29, 1948

AERONAUTICS

Fog-Piercing Lights Aid Blind Landings

➤ TWO COMMERCIAL airports of the United States, one in Washington and the other in Los Angeles, are to be equipped with recently developed and tested high-intensity approach lights, the Civil Aeronautics Administration revealed. They are lights that penetrate fog for considerable distances and permit pilots making instrument landings to make the last part of their approach visually.

The powerful lights include a new type of optical system consisting of ground and polished glass and molded red plastic lenses. Each light is equipped with a five-kilowatt incandescent lamp. The system comprises a row of lights 3,000 feet long, spaced 100 feet apart, which extends out from the approach end of the instrument runway. The intensity of the lights can be regulated from the control tower. Each of the two installations, for which contracts have now been signed, will cost about \$100,000.

Science News Letter, May 29, 1948

ENGINEERING

Heat-Conducting Glass De-Ices Windshields

➤ NO ICE will form on automobile windshields the glass of which is heated by electricity passing through an invisible film coating. There is one catch, however. Higher voltage is necessary than found on the average family automobile.

The new windshield is a product of Libbey-Owens-Ford Glass Company and has been thoroughly tested during the past winter on several cars in all sorts of freezing rain and below-zero weather. The glass is heated by a continuous electric current which passes through the coating. The covering film is basically stannic oxide, which can be made from any number of tin compounds. Its slight coloring offers no noticeable decrease in visibility.

The recommended scheme to get sufficient voltage is to replace the conventional generator on the car with an alternating current generator. Its current can be transformed to voltages sufficiently high to perform the heating operation. Generators now used in cars for radio transmission can be used for the de-icing.

Science News Letter, May 29, 1948

ENTOMOLOGY

Air War on Pests

Trees sprayed with DDT from the air to kill the gypsy moth, tussock moth and other insects. "Ground troops" guide the pilots.

By ALFRED STEFFERUD,

U. S. Department of Agriculture
Written especially for Science Service

See Front Cover

➤ WAR FROM the air is being waged on enemies within our boundaries—fifth columnists who for years have been destroying American homes even before they could be built. These enemies are insect devourers of our forests—East, West and South—that rank second only to fire in their destructiveness. Swooping planes are distributing death to them in the form of DDT spray. For the first time, defenders of our forests feel that they are not waging a losing battle.

First of these pests to come under attack has been the gypsy moth. This undesired immigrant is a little insect with a devastating appetite for the leaves of oak, apple, maple, and other forest, fruit, and shade trees. It has destroyed millions of feet of timber that we could well have used for houses and furniture and paper and countless other items.

Now, a quarter-century after the insect became one of our worst pests and just a few years after we mounted a full-scale offensive against it, we have a way to prevent such damage.

In New England in 1924 larvae of the gypsy moth stripped leaves off trees on 825 acres. Trees need leaves to make and assimilate food; most of them die after two or three consecutive years of defoliation.

800,000 Trees Stripped

In 1945 trees were stripped of their leaves on 800,000 acres in New England, an area of general infestation; in New York, into whose eastern counties the insects were blown by the hurricane of 1939; and in northeastern Pennsylvania, where the infestation covers about 100 square miles.

Against the pest, federal and state agencies, chambers of commerce, local authorities, and property owners joined forces. The first experimental sprayings with DDT were made in 1945. The

next year 54,000 pounds of the insecticide were applied to 80,000 acres of infested timber, three-fourths of it by airplane. Last year twice that acreage was treated. The results have been spectacular: Not one living gypsy moth has been found in the treated areas. The fourth great battle is now in full swing.

In May the caterpillars hatch from the yellow, hair-covered masses of eggs the female moths deposited last July and August on tree trunks, fences, walls, junk piles. The caterpillars commonly crawl no more than 200 feet, but they move by spinning down their silky threads. Sometimes they fall on passing vehicles or are carried by the wind.

First they eat the trees' buds. Then as they grow they devour blossoms and leaves. The best time to fight them is in the spring, beginning about two weeks before the hatching and continuing until the caterpillars are full grown.

In Pennsylvania, where last year pilots treated 45,000 acres, the spraying of 150,000 acres began this year on April 20, to continue into June. In New York, around Albany, 50,000 acres are being sprayed.

Front Line Fighters

Airplanes are the front-line fighters, but for isolated infestations along roadsides and in villages and out-of-the-way place, the workers use ordinary knapsack sprayers, or high pressure blower units, which are effective up to 300 feet, or sometimes more if the wind is just right.

Before the work is undertaken, entomologists and other trained men carefully survey the infested areas to establish boundaries and priority of treatment. Sometimes they examine a locality tree by tree. Sometimes they make spot surveys at selected points only. In that way in 1946 about 970,000 acres were inspected.

Another way is to set out traps two miles or less apart in districts to be surveyed. The traps are paper cones and sheets of sticky paper, to which the males are lured by a sex-attractant substance obtained from female gypsy moths. If a male is caught, more traps

are put nearby to fix the site of the infestation more exactly. In this way 6,000,000 acres were scouted in 1946. More than 11,000 traps were used; more than a million pupae were collected for the sex-attractant material.

To guide the pilots, white or orange windsocks are attached to the higher trees, spaced closely enough so that one is always in sight. Sometimes gas-filled balloons, operated from the ground, are used to mark the line of flight, especially in mountainous country.

Test With Glass Plates

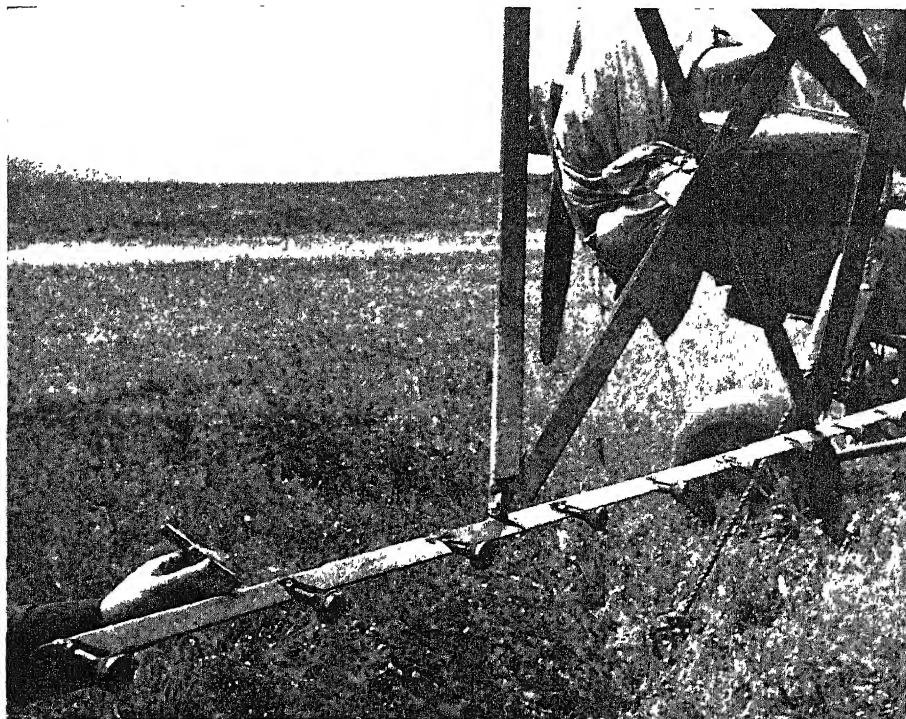
To make sure of good coverage, glass plates are placed 25 to 50 feet apart on the ground along the line of flight. The coverage is measured by the deposit of atomized particles on them. Not often does a pilot have to repeat, so careful are the plans and performance.

The record for a day's work was set last May 15, a still, clear day and ideal for low flying, when four planes covered 4,605 acres in Pennsylvania. Early morning or late afternoon are considered the best times for spraying.

Technicians assigned to observe the effects on wildlife found no indications of injury to bees, birds, fish or other wildlife—except to crayfish and some



EFFECTIVE TEST—Glass plates set at right angles to the path of the spraying plane pick up samples of droplets and thus give an idea of effectiveness of the attack.



TO SPREAD DEATH—Close-up of the multiple-nozzle DDT armament of a single-motored plane. Ranger's hand with fountain pen gives an idea of size.

fish in one shallow pool over which the plane, whose shut-off device was not working properly, had to fly several times in making turns. Nevertheless, as a precaution, pilots avoid flying directly over streams and ponds when spraying.

Some of the infested areas had 4,000 egg clusters to the acre before treatment; after spraying, 39,500 acres were carefully examined, and only 12 clusters were found. On the basis of this evidence, state and federal entomologists believe that the next few years will bring the eradication of the gypsy moth in many areas where it has been most destructive. In the operations this year they expect to cover all areas known to be infested in Pennsylvania. Next year the major control operation will be in New York.

Against Tussock Moth

Equal success attended the campaign against the Douglas-fir tussock moth, a relative of the gypsy moth, last year in northern Idaho, Oregon, and Washington. That battle by workers in the Bureau of Entomology and Plant Quarantine and the Forest Service of the Department of Agriculture, State and regional foresters, and forest owners was the largest forest-insect spraying project of its kind ever undertaken. In

two weeks 390,881 gallons of DDT solution were sprayed in 2,120 flights over 413,469 acres, nearly all mountainous.

A view of the spraying is shown on the front cover of this SCIENCE NEWS LETTER.

A few days after the spraying few living caterpillars could be found anywhere in the sprayed area.

Some work has been going on on the white-fringed beetle in Georgia, the Carolinas, Florida, the Gulf Coast area as far west as Louisiana. This beetle was introduced several years ago and has been a problem since 1937.

Use DDT Entirely Now

In the past two years, spraying has been entirely with DDT—airplanes and ground equipment were used. About 200,000 acres were infested, in Georgia, Alabama, Florida, Louisiana, Mississippi and North and South Carolina.

This year about 37,000 acres are being treated. The work centers are at Gulfport, Miss., and in Macon, Ga. The heaviest infestation is the Alabama and Georgia area, narrowing off farther west and farther east. DDT is being used for the adult beetles, but also has been found effective for eliminating the larval stages from the soil. About 10 pounds of DDT are used per acre in

tillable areas. This amount is effective for at least four years. Entomologists are especially interested in the fact.

The unbalance that has permitted epidemics of defoliating moths is still with us. Why these occasional upsets in the natural balance among native organisms, parasites, and predators that, in virgin wilderness, keep in check certain dangers is not fully understood. No doubt they are man-made to some extent.

Cooperative big-scale action is needed against other insects in our forests—the white pine weevils in the Northeastern and Lake States; the spruce budworm, which is becoming serious in New England; the pink bark beetle, which has caused heavy losses in the West and the larch sawfly, which has killed many mature stands of larch in the Lake States.

Science News Letter, May 29, 1948

"Forty-Niner" is the name of a relatively new hybrid tea rose which is a rich yellow outside and vivid red inside.

LINGUAPHONE



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Do You Know?

Monosodium glutamate is a metallic salt of *glumatic acid* derived from grain; it is one of the world's most potent flavoring materials.

Freshly cut *fence posts* treated with chromated zinc chloride will last 10 to 15 years, in contrast to a life of two to four for untreated posts.

Glass fibers are used to reinforce *plastics* much as steel rods are employed to reinforce concrete.

All automobile paints used today, except black, contain *aluminum flakes* to give a special sheen.

PUBLIC HEALTH

Death Rate Down for "Catching Diseases"

➤ IN SPITE of this being a big measles year, the combined death rate for the four chief "catching" diseases of children, measles included, reached a new low during the first quarter of the year, statisticians of the Metropolitan Life Insurance Company report.

The death rate among the company's industrial policyholders for measles, scarlet fever, whooping cough and diphtheria combined was 1.6 per 100,000 for the first three months of the year. The rate for measles was only 0.6 per 100,000.

A "truly remarkable" record has been established for tuberculosis so far this year, also. The death rate from this disease for the first quarter of 1948 was 28.2 per 100,000 policyholders. This is 13% below the rate for the same three months last year and 25% below the average for the same parts of the preceding five years.

Science News Letter, May 29, 1948

Anyone Can Use A Slide Rule

No Math Background needed if You Have the *Practical Slide Rule Manual* by J. M. Klock, formerly Mathematician for the U. S. Navy and Instructor in the Detroit Public Evening Schools.

An absolutely non-technical explanation of how to use a slide rule for the fundamental math calculations. If you know the simplest arithmetic you can easily learn the slide rule with this booklet. Special applications made to formulae from mathematics, engineering, aeronautics, etc. Includes office applications to per cent, interest rates, cost accounting. Large illustrations. Simple explanations. Sent postpaid.

(Please make checks payable to J. M. Klock)

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Detroit 31, Michigan

PHYSICS

Five Kinds of Atom Bomb

But probably none is radically new, using the fissionable materials we already know about such as uranium, plutonium and elements from thorium.

➤ AMERICA now has five different kinds of atomic bombs, the most modern of which tested at Eniwetok are presumably both more powerful and cheaper.

That is the conclusion to be drawn from the terse, unrevealing announcement that "tests involving three atomic weapons each of improved design" were successful in all respects and that results indicate very substantial progress.

The new tests do not, in all probability, involve any radically new and novel bombs, such as the hydrogen-helium bomb or the meson bomb about which there has been some speculation.

The stuff in them is basically the fissionable materials that we have been told about, uranium, plutonium and possibly kinds of uranium or other heavy elements made from thorium.

The Hiroshima atomic bomb was

made of uranium 235 and the second bomb used on Nagasaki was made of plutonium, the synthetic element made in the atomic pile from the more common sort of uranium isotope 238. Similarly the new bombs are probably improved mixtures of fissionable elements or materials not used before.

Manufacture of bombs by new methods or further research upon new nuclear materials and methods is indicated by the portion of the statement that said "The President gave general approval of commission plans for steps it proposed to initiate at once for further nuclear development, based upon information gained from the tests."

This may even indicate a different emphasis to atomic materials manufacture such as carried on at Hanford, Wash.

Science News Letter, May 29, 1948

ASTRONOMY

Dedicate "Big Eye"

➤ THE 200-INCH telescope atop Palomar Mountain will officially begin work to extend man's reach twice as far into space following its dedication on June 3. About a thousand guests have been invited for the event.

This gigantic "eye" will put at our disposal eight times the volume of space previously available for study. Palomar Observatory will be run jointly by the California Institute of Technology to whom the telescope actually belongs, and the Carnegie Institution of Washington, which owns the Mt. Wilson Observatory.

Master of ceremonies for the dedication will be James R. Page, chairman of Cal Tech's Board of Trustees. Dr. Raymond B. Fosdick will speak for the Rockefeller Foundation that to date has given \$6,500,000 for the construction of the telescope, together with all the buildings and equipment necessary to render it as effective as possible.

Dr. Lee A. DuBridge, president of Cal Tech, will deliver the dedication address. Dr. Vannevar Bush, president of the Carnegie Institution of Washing-

ton, will be another speaker.

Short speeches will also be given by two men most intimately connected with the telescope. They are:

Dr. Max Mason, chairman of the Observatory Council which designed and directed the Palomar project.

Dr. Ira S. Bowen, who will direct both Mt. Wilson and Palomar Observatories, will also explain and demonstrate operation of the 200-inch telescope.

Science News Letter, May 29, 1948

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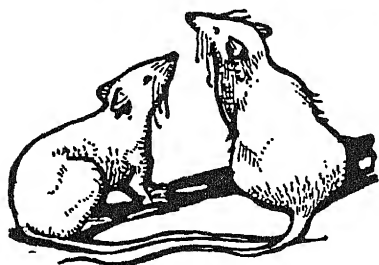
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The region abounds in geological and historical interest—dinosaur bones, marine fossils and Indian implements are found nearby.

Write for folder—Paton Ranch, Shell, Wyoming



Rats and Flies

➤ SUCCESS in the anti-rat campaigns waged in hundreds of American communities this spring is likely to increase the number of carrion flies, because there will always be some dead rats in corners and crannies where even the more careful human search will not find them.

Commonest among these are the bluebottle flies, breeders in carrion and feeders on filth. For instead of laying their eggs in horse-manure for choice, as houseflies do, they deposit them on the dead and decaying carcasses of animals, which they find unerringly through their almost uncanny sense of smell. They have been used to locate dead rats and mice in houses, by releasing them in a room and then cutting through floor or wall at the spot where they cluster. If, as the never-completed old song says, there were "Forty-nine bluebottles, hanging on the wall," it's a fairly safe bet there was something dead back of that wall.

Their unsavory infancy ended, bluebottles enter upon an adulthood that is even more malodorous. For their favorite food is filth—just plain dung. You

will often see them clustered thick where some supposedly civilized city dweller has been walking a housebound dog, permitting the animal to relieve itself on public property or, worse still, on somebody else's grass-plot. Then the same insects may try to get into your dwelling, to explore your food.

What makes them most conspicuous is their bright coloring. There are three kinds: some blue, some green, some with a bronzish cast, but all with a gleaming, burnished, metallic appearance, as if they were enameled. Eyes of all three species are red. They could really be considered beautiful insects, were it not for their highly un-beautiful background and habits.

Incidentally, the entomologist who bestowed upon this glittering but filthy insect the generic name *Lucilia* merits small thanks from girls bearing that name, and its more frequent variants, *Lucelia* and *Lucille*. It is really a beautiful name, for it means "child of light"—which the bluebottle fly most decidedly is not.

Science News Letter, May 29, 1948

AERONAUTICS

Hydraulic Fluids With Water Base Safe

➤ NON-COMBUSTIBLE hydraulic fluids with a water base, for use in aircraft, were revealed by the Department of the Navy. They will not burn, and are said to be the first successful non-inflammable hydraulic fluids ever made.

The new material has been dubbed hydrolube fluids. Their use in landing gear, brake and flap control hydraulic systems will eliminate fire hazards when high-pressure hydraulic lines are ripped open by bullets or shrapnel. The material will be of value in both military and civilian airplanes by lessening danger in emergency landings when hydraulic lines are sometimes ruptured.

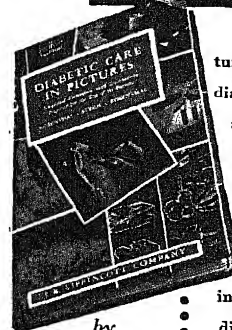
Hydrolube fluids, replacing combustible petroleum-base materials, have been thoroughly tested in Navy planes during the past two years. They are now being tested by the Civil Aeronautics Administration for commercial airplane use. They contain, in addition to the water, an anti-freeze, a thickener, corrosion inhibitors, a wear preventive and an organic chemical to make all the ingredients soluble.

Ethylene glycol is used as the anti-freeze. A special polymer is added to the water and glycol to increase the thickness. In addition to not burning, the material has a freezing point 82 degrees Fahrenheit below that of water, is much less corrosive than water, has greater freedom from packing deterioration and leakage than present hydraulic fluids, and has satisfactory lubricating qualities.

Hydrolube was developed in the Naval Research Laboratory by Dr. W. A. Zisman and assistants. In parts of the development, the laboratory had help from the DuPont Company, Wilmington, Del., and the Carbide and Carbon Chemicals Corporation of New York.

Science News Letter, May 29, 1948

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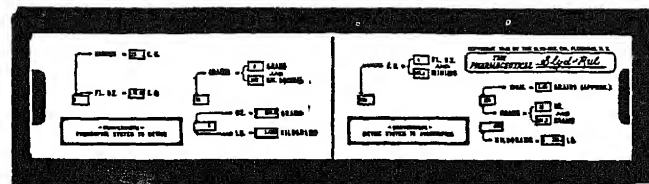
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PHYSIOLOGY

Can Air-Condition Tropics

Adequate food supply is called primary need of tropics, but after that provision of improved living condition is most important.

➤ AIR-CONDITIONING indoor sleeping and working quarters in the humid tropics the year around can be done and is just as practical as heating homes and buildings of New York or Philadelphia through the winter, a physiologist, Dr. H. C. Bazett of the University of Pennsylvania, told the Congress of Tropical Medicine and Malaria meeting in Washington.

Provision of improved living conditions is the second greatest need of the tropics, Dr. Bazett said.

Assurance of an adequate food supply is the primary need.

Muscular work can be performed efficiently in the tropics, but the quantity that can be done is limited.

Mental work, on the contrary, suffers on both counts, quantity and quality.

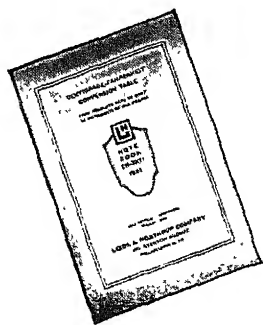
The reason for the differences, Dr. Bazett explained, lies in the different ways the body handles heat during exercise and rest. During rest, most of the heat is formed in the trunk and dissipated through the arms and legs. Transporting the heat is a major problem. But during exercise most of the heat is formed in the arms and legs where it is also dissipated. So the transport problem becomes minor.

A person's mental work gets poor in both quality and quantity with very slight changes in body temperature, experiments have shown. The person himself may not be aware of the falling off in quantity and quality of work he is doing. Inadequate circulation of blood through the brain may be the cause of the deterioration in mental work.

Only a small degree of cooling is needed to correct the disability for mental work, Dr. Bazett stated. This is one reason why the job of cooling the tropics can be done efficiently. The amount of cooling needed is not so great. A temperature of 78 degrees Fahrenheit with humidity at the point of a saturated atmosphere is cool enough for efficient working.

With well-insulated buildings, this temperature could be achieved in Bombay throughout the year, Dr. Bazett said, with "an energy load for air conditioning far below the normal heat load for heating houses in Philadelphia or New York through the winter."

Science News Letter, May 29, 1948



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MEASURING INSTRUMENTS TELEMETERS AUTOMATIC CONTROLS HEAT-TREATING FURNACES
Jrl. Ad EN-33(1a)

set up by the Secretaries of Defense and Commerce working together. The joint action is the result of a six-months study made by the Research and Development Board of the National Military Establishment. This organization recommended that a single group be established under the Department of Commerce and charged with the responsibility for the research, development and standardization of the national air navigation system.

Such a group would constitute a planning and steering organization, headed by a man of national reputation and not representing any government agency concerned with civil or military aviation. It would have under it an engineering staff charged with translating the broad requirements set by the board into technical specifications for the development of projects which would be executed under contract by university and commercial laboratories.

Science News Letter, May 29, 1948

SAFETY

Place Next the Driver Is Called "Death Seat"

➤ "DEATH SEAT" is the name given the front seat of an automobile next to the driver (*Journal, American Medical Association*, May 22).

Of 50 consecutive patients with face injuries from automobile accidents, almost three fourths (70%) were young women and girls who had been riding next to the driver, Dr. Claire L. Straith, Detroit plastic surgeon, reported.

Detroit police department records show that in 219 accidents involving more than one occupant of an automobile, 260 passengers but no drivers were injured. More than half the front seat passengers had face cuts and damage to the teeth, chin, nose, cheeks, ears, forehead and skull.

Dr. Straith's suggested remedy for the situation is removal of all knobs, cranks, drop down ash trays and sharp ledges on the dashboard and use of rubber padding on the dash in front of the guest passenger.

Science News Letter, May 29, 1948

Automotive engineers advise drivers, as a gasoline-saving step, to warm up engines by letting them idle a few minutes to permit oil to circulate properly; the engines should not be raced.

AERONAUTICS

To Set Up Basic Air Navigation System

➤ A TEMPORARY working group from the U. S. Air Force, Navy and Civil Aeronautics Administration is formulating plans for an Air Navigation Development Board which will be charged with the duty of preparing a single basic system of air navigation and traffic control for both civil and military users, it was revealed in Washington.

The new government board will be

Books of the Week

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BOTANY AND OUR SOCIAL ECONOMY—Alexander C. Martin—*National Wildlife Federation*, 30 p., illus., paper, 10 cents. Pointing out our dependence on plants.

THE CHEMISTRY OF ACETYLENE AND RELATED COMPOUNDS—Ernst David Bergmann—*Interscience*, 108 p., \$3.00. Material presented at a seminar on acetylene chemistry at the Polytechnic Institute of Brooklyn in 1946.

THE DEVELOPMENT OF THEORETICAL ELECTROCHEMISTRY—Raymond M. Fuoss—*Pennsylvania State College*, 24 p., paper, \$2.00. Twenty-Second annual Priestley Lecture.

EMPIRE'S CHILDREN: THE PEOPLE OF TZINTZUNTZAN—George M. Foster assisted by Gabriel Ospina—*Smithsonian Institution*, 297 p., 16 pl. One of a series of monographs describing results of joint field studies of the Institute of Social Anthropology and the Escuela Nacional de Antropología de Mexico.

GEOLOGY AND GROUND-WATER RESOURCES OF SEWARD COUNTY, KANSAS—Frank E. Byrne and Thad G. McLaughlin—*University of Kansas*, 140 p., illus., paper, 25 cents.

THE LABOR FORCE IN THE UNITED STATES, 1890-1960—John D. Durand—*Social Science Research Council*, 284 p., \$2.50. An interesting statistical study with serious predictions for the future.

LIVE LONG AND LIKE IT—C. Ward Cramp-ton—*Public Affairs Committee*, 32 p., illus., paper, 20 cents. Advice for those over forty on how to avoid being older than their years.

MICROWAVE MAGNETRONS—George B. Collins—*McGraw-Hill*, 806 p., illus., \$9.00. All the information necessary to make a magnetron, important component in radar systems.

MINERAL RESOURCES OF COLORADO—John W. Vanderwilt—*Colorado State Mineral Resources Board*, 547 p., illus., \$2.50. From a state wealthy in metals, non-metal minerals, and fuels.

NURSING PATHOLOGY—Raymond H. Goodale—*Saunders*, 416 p., illus., \$3.00. To give the nurse the necessary background so that she can provide intelligent care.

ORIGIN OF GRANITE—H. H. Read, A. F. Buddington, F. F. Grout, G. E. Goodspeed and N. L. Bowen—*Geological Society of America*, 139 p., illus., \$1.80. Papers presented at a conference at the meeting of the Geological Society of America in 1947.

PHYSICS TODAY—Vol. 1, No. 1, May 1948—*American Institute of Physics*, \$4 year. First issue of a new journal being sent to all members. Dr. Vannevar Bush writes on "Trends in American Science."

PHYSIOLOGY OF MUSCULAR ACTIVITY—Edward C. Schneider and Peter V. Karpovich—*Saunders*, 3rd ed., 346 p., illus., \$3.75. Adapted primarily for students of physical education.

QUANTITATIVE ANALYSIS—Willis Conway Pierce and Edward Lauth Haenisch—*Wiley*, 3d ed., 520 p., \$3.75. A first-year

textbook almost entirely rewritten to bring it up to date.

SEX VARIANTS—A study of Homosexual Patterns—George W. Henry—*Hoerber*, one-vol. ed., 1130 p., illus., \$8.00. Results of a research program of importance to those concerned with the medical, legal or social problems of homosexuality.

TEMPLES IN YUCATAN: A Camera Chronicle of Chichén Itzá—Laura Gilpin—*Hastings House*, 124 p., illus., \$5.00. A book of beautiful photographs showing ancient ruins of the Maya together with glimpses of modern life.

TEXTILE TESTING IN GERMANY—Herbert F. Schiefer, Lyman Fourt, and Richard T. Kropf—*Textile Research Institute*, 57 p., illus., paper, \$3.50. Prepared from information obtained in 1945 by the Technical Industrial Intelligence Committee of the U. S. Army.

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PHYSICS

Meson Trails Captured

Use new photographic emulsion containing eight times as much silver bromide and also boron to magnify tracks and keep them from fading.

➤ A NEW and special kind of photographic plate is being used to take pictures of mesons, small cosmic ray particles.

The new Ilford photo emulsion has been developed to photograph the trail of these elusive particles in the laboratory of Dr. C. F. Powell. This emulsion contains eight times as much silver bromide as older emulsions in order to magnify the path of a particle on the photographic plate. It also is loaded with boron, which prevents the tracks left by the particle from fading and makes the emulsion less sensitive to light.

Since pre-war days it has been possible to take pictures of protons, deuterons, alpha particles and fission fragments on photographic emulsions, but until recently it has been very difficult to distinguish between the tracks left by the different particles. In addition, very light particles could not be traced because they did not have enough energy to leave much of a trail in the emulsion.

Since cosmic rays are believed by scientists to come from outside the atmosphere of the earth, perhaps from the stars, plates to catch the traces of these rays in the form of mesons are exposed

on the tops of mountains. Only when the meson actually ends up in the emulsion can one be sure that the trail in the emulsion is due to a meson and not any other particle.

The plates after exposure are examined under strong microscopes by the scientists. By studying the plates they are able to determine the mass of the meson, evidences of nuclear degeneration and other facts which increase our knowledge of the hitherto little known cosmic rays.

UNITS IN PERSONAL HEALTH AND HUMAN RELATIONS—Lillian L. Biester, William Griffiths and N. O. Pearce—*University of Minnesota Press*, 267 p., \$3.50. Teaching material for sex education.

VOLUNTARY MEDICAL CARE INSURANCE IN THE UNITED STATES—Franz Goldmann—*Columbia University Press*, 228 p., \$3.00. Background material on a very timely question.

WIDENING HORIZONS IN MEDICAL EDUCATION—A Study of the Teaching of Social and Environmental Factors in Medicine, 1945-1946—Joint Committee of the Association of American Medical Colleges and the American Association of Medical Social Workers—*Commonwealth Fund*, 228 p., \$2.75.

YEARBOOK OF FOOD AND AGRICULTURAL STATISTICS, 1947—*Food and Agriculture Organization*, (Columbia University Press) 261 p., paper, \$2.50. Up to date figures on world agricultural production and livestock numbers. Has table of contents in English, French, Spanish and Chinese.

Science News Letter, May 29, 1948

on the tops of mountains. Only when the meson actually ends up in the emulsion can one be sure that the trail in the emulsion is due to a meson and not any other particle. The plates after exposure are examined under strong microscopes by the scientists. By studying the plates they are able to determine the mass of the meson, evidences of nuclear degeneration and other facts which increase our knowledge of the hitherto little known cosmic rays.

Science News Letter, May 29, 1948



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☛ **THREE-PIECE UNIT**, for the home, can be used to squeeze and strain orange juice, make milk shakes or mix drinks. It is made of an attractive plastic, odorless and tasteless, that is unaffected by fruit juice or alcohol and able to withstand hot water up to the boiling point.

Science News Letter, May 29, 1948

☛ **MINIATURE FLUORESCENT magnifier**, for detailed observation of organisms, tissues, material structures and chemical reactions, is a combination of an optically accurate magnifying lens with a compact source of intense, glare-free, fluorescent light. Although small in size, it solves many "seeing" problems.

Science News Letter, May 29, 1948

☛ **ICE BUCKET**, made of sturdy, mahogany-colored plastic with a transparent cover, holds nearly three quarts and is guaranteed to keep ice more than twelve hours. Because of its double-wall construction, it can be used also to keep foods hot.

Science News Letter, May 29, 1948

☛ **BUILDING MATERIAL**, made of chemically treated and impregnated wood fiber from sawmill wastes mixed with Portland cement, is shaped under pressure into slabs, blocks and panels. This lightweight semi-structural product can be used for walls, floors, ceilings or partitions, and can be cut, sawed and nailed.

Science News Letter, May 29, 1948



☛ **SODA MIXER** is clamped on the top of a sparkling beverage bottle, as shown in the picture, and delivers charged water as needed when a button on the top is pressed. When the button is released, a valve is closed and the remaining liquid and bubbles are safely sealed in the bottle for many weeks.

Science News Letter, May 29, 1948

☛ **SAFETY BELT** for baby in an automobile has an elongated metal anchor which is merely pushed into place behind the seat cushion without the use of tools. The holding straps buckle around the child like airplane belts, and may be left in the car permanently because they

are not in the way and will not injure clothing.

Science News Letter, May 29, 1948

☛ **FLASHLIGHT**, for photographers, is a photoelectrically controlled unit, that fires the flash bulb in it at the same time with the flash lamp on the camera, without connecting cords. It will not accidentally fire when room lights are turned on; it responds only to pulses of light such as photo flash lamps produce.

Science News Letter, May 29, 1948

☛ **FOOD REMINDER**, an attractive metal device to hang on the kitchen wall, has two columns and 24 movable tabs with the names of principal foods printed on them. The tabs can be slid as needed from one column headed "I have" to the other headed "I need."

Science News Letter, May 29, 1948

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Question Box

AERONAUTICS

How can aircraft and missiles be tested at air speeds close to 3,000 miles per hour? p. 338.

MEDICINE

How have hundreds of lives been saved among tuberculous patients? p. 341.

What new drug may be useful against cholera and dysentery? p. 340.

Photographs: Cover, p. 346, p. 347, Central Aircraft Co.; p. 339, Westinghouse Research Laboratories; p. 341, International Telephone and Telegraph Corp.; p. 343, Beck-Lee Corp.

PHYSICS-MEDICINE

What new device will aid in earlier diagnosis of stomach cancer? p. 339.

PSYCHIATRY

Can hate be felt before birth? p. 342.

How can soda water gas aid mental patients? p. 343.

How does a 10-minute brain operation relieve mental disease? p. 338.

What drug banishes mental delusions? p. 339.

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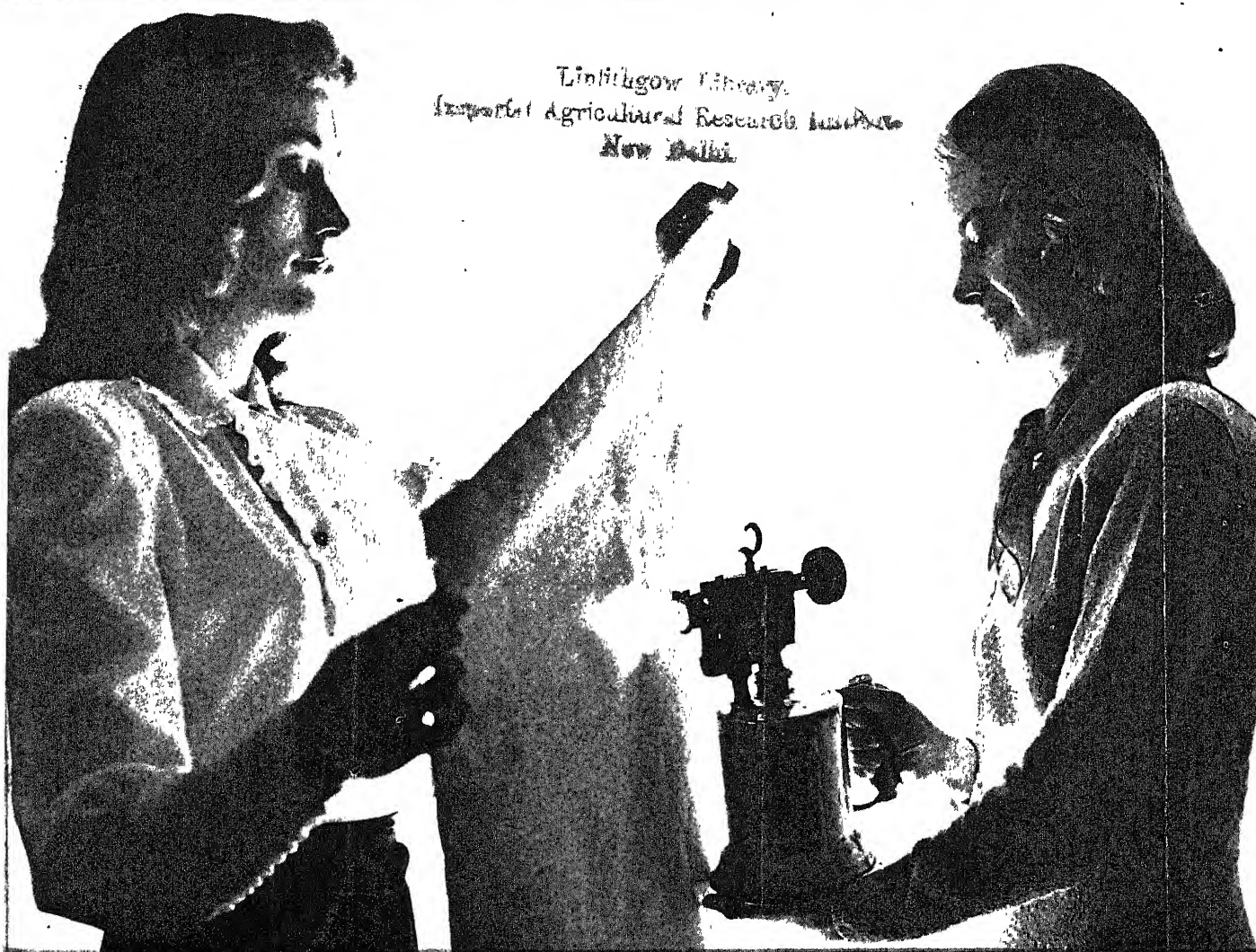
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SCIENCE NEWS LETTER



Vol. 53, No. 23

THE WEEKLY SUMMARY OF CURRENT SCIENCE • JUNE 5, 1948



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Mineral Paper

See Page 358

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ELECTRONICS

Music Coded By Pulses

This new form of radio transmission is called pulse modulation and resembles telegraphy. It eliminates noise arising in transmission and gives good sound reproduction.

➤ MUSIC and voices can now be sent over the radio waves by a method which closely resembles telegraphy.

Pulse modulation, the new form of radio transmission, is being developed in the electronics laboratories at Massachusetts Institute of Technology by B. D. Smith, working under the supervision of Prof. William H. Radford. Similar studies are also being conducted in other parts of the country, notably in the Bell Telephone Laboratories.

Sounds to be "sent over the air" are coded, each sound wave amplitude being represented by some number on the binary scale, which is a number system using two as a base. An example of this system is the way shop mechanics measure distances in inches, half inches, quarter inches, and so on.

The name pulse modulation comes from the fact that the coding into binary numbers is done by pulses of electricity shown on a cathode-ray oscilloscope. There are five consecutive pulses of electricity in the model now being tested at M. I. T. In numbers on the binary scale this means that there are actually 32 separate numbers which can be represented; this gives 32 separate amplitude levels.

A beam of light may cross the oscilloscope screen at any one of 32 levels which are determined by the in-put voltage. A coding plate is put in front of the screen. This plate, which looks like a black card with transparent lines of varying lengths on it, transforms the picture on the oscilloscope into a series of flashes of light. These flashes are taken up by photoelectric cells and sent over the air as radio impulses. The whole picture on the oscilloscope is scanned once every ten-thousandth of a second.

These impulses reach the receiving apparatus, where they are converted into voltages. The amount of the voltage depends on what time during the ten-thousandth of a second the impulse arrives. In this manner the picture of the sound wave on the screen of the cathode ray oscilloscope is reconstructed in the receiving apparatus and the sound is reproduced through a loud speaker.

Since the sound is transmitted as a series of dashes the resemblance of this apparatus to telegraphy is marked. This pulse modulation system eliminates to great extent any noise which might arise in transmission and gives excellent sound reproduction. The final form of the apparatus is also expected to be quite inexpensive.

Science News Letter, June 5, 1948

TECHNOLOGY

Exposure Time of X-Rays Reduced by New Screen

➤ EXPOSURE time for taking an X-ray picture will be cut in half with use of a new high-speed X-ray intensifying screen now in production by the DuPont Company, Wilmington, Del.

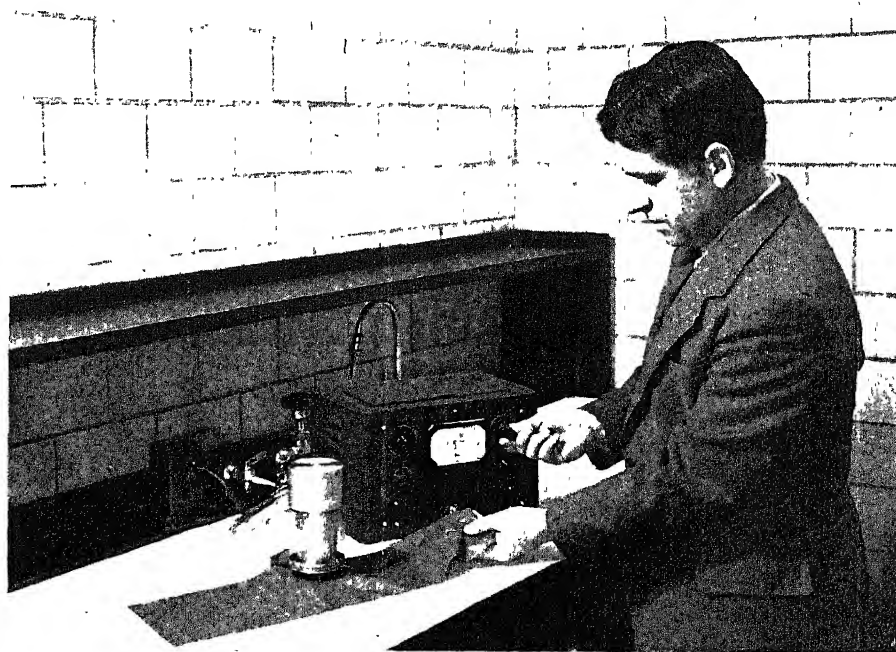
Most important of the many advantages this offers is the decrease in time

necessary for the exposure. Since there is a limit to the amount of X-radiation that can be given, doctors are careful to expose a person as briefly as possible in taking pictures for diagnosis. This is particularly important if the patient is likely to need X-ray or radium treatment later. Difference between the new screen and present-day screens is in chemical composition. The new screen is made possible by use of a luminescent chemical new to the field, barium lead sulfate. This chemical is stable under both X-rays and light rays.

Calcium tungstate is the chemical which has previously been used as the principal component of intensifying screens for X-ray pictures. The new screen extends the distribution of fluorescence from 2800 angstrom units to 4600 angstrom units, with the maximum response at 3800. This is much further into the ultraviolet than the calcium tungstate screens extend.

The new screen should reduce the costs of X-ray pictures because it will increase the capacity of smaller X-ray outfits, such as portable ones, will save the tube life in the big machines and will take more pictures in the same time

Science News Letter, June 5, 1948



UNIQUE MEASURING DEVICE—A gauge for measuring the thickness of thin rubber and other thin films on continuous production equipment, has at its heart a radioactive isotope, byproduct of the nation's atomic energy plants. Shown in the picture is W. E. Morris, who developed it in the research laboratory of the Goodyear Tire and Rubber Company. It is capable of measuring material as thin as one-thousandth of an inch.

MEDICINE

Paralyzed Walk Again

Hemiplegia patients respond to physical medicine treatment utilizing massage, applications of heat, therapeutic baths and active exercises.

➤ AN INTENSIVE program of rehabilitation which enabled patients with partial paralysis to walk again is reported by Comdr. Edward W. Lowman (MC), U. S. N., Department of Physical Medicine, of the U. S. Naval Hospital in Philadelphia in the *Journal of the American Medical Association* (May 29).

Use of physical medicine, which proved so effective in these patients, includes massage in the first stages of treatment, application of heat and therapeutic baths, followed by active exercises in bed when the patient is able to move.

The patient is encouraged to try to walk within two to eight weeks after treatment is started. This is a gradual process, beginning with sitting up in bed and placing the feet on the floor from

the bedside, and concluding with exercises in the gymnasium.

Twelve out of 18 patients with hemiplegia, paralysis of one side of the body following brain hemorrhage, responded to this reconditioning program within 118 days. Treatment was begun two to four weeks after the onset of their illness. Three others of the group showed definite improvement while three did not respond to the treatment.

Nine out of ten additional patients learned to walk again after 67 days of treatment, with improvement being noted in the other patient.

Commander Lowman attributed the greatest factor in the success of the rehabilitation treatment to "cooperation on the part of the patient, fostered by his desire to regain his independence."

Science News Letter, June 5, 1948

AERONAUTICS

Safer Rough-Sea Landings

➤ AN experimental flying boat with a new type of lengthened hull, to permit safer landings in rough sea, has made its first flight, the Glenn L. Martin Company revealed. It was developed for the U. S. Navy, and its new hull is expected to improve materially the performance of flying boats.

The most striking feature of the Martin XP5M-1, as it has been designated by the Navy, is the length of its afterbody. By extension of the hull bottom to the extreme end of the plane, a much longer base is provided between the main and the rear steps. This lessens pitching and bouncing in rough water, and also protects the tail surfaces from the waves by the added buoyancy in the stern.

Model tests show that this added length will reduce the normal time and distance required for takeoff, and also give a smoother takeoff. On landing, the point of the step touches first and noses the plane down gradually so that skipping-off will not occur.

The new flying boat will require a crew of 11. Every reasonable provision for the men will be installed, including

heating and ventilation, bunks, and a galley for cooking so that they can stay aboard for several days at a time if necessary. It is powered with two Curtiss Wright engines, each of which develops 2,700 horsepower. When completely developed it is expected to have a greater range than present flying boats of its class.

Science News Letter, June 5, 1948

ENTOMOLOGY

New Deadly Spider Species Discovered in Palestine

➤ A NEW black widow spider species has been discovered in southern Palestine, before the beginning of the present turmoil made field work impossible. It has been given technical description by Dr. A. Shulov of the University of Jerusalem.

The new spider is more variable in both color and markings than its coal-black American relative. Its hue ranges from black with a brownish cast to a yellowish gray. The abdominal markings are yellow, and more elaborate than

the familiar red hourglass pattern of the American species.

It is apparently highly poisonous, for when captured specimens were permitted to bite a number of mice and rats most of the animals died.

It spins its webs in the open, on shrubs and wire fences. Most of its prey consists of beetles, but it also captures ants and occasionally even small scorpions.

Dr. Shulov has named the new species *Latrodectus revivensis*. The first or generic name it shares with all black widow spiders. The second or specific name refers to the settlement of Revivim, where it was first found. Full technical description is published in the biological journal, *Ecology* (April).

Science News Letter, June 5, 1948

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MEDICINE

Dye Locates Brain Tumor

This radioactive spotting method, by which abnormal growths can be detected through skull and skin, has proved diagnostically successful in a dozen cases.

► BRAIN tumor detection by means of a radioactive dye that becomes concentrated in these abnormal growths and can be detected through skull and skin with a Geiger-Muller counter is the newest medical development in the use of atomic-pile byproducts.

It has been tried out successfully in a dozen cases at the University of Minnesota Medical School, and is reported in *Science* (May 28) by Dr. George E. Moore, senior research fellow of the U. S. Public Health Service.

It was already known that a dye called fluorescein has an affinity for tumorous tissue. To render it radioactive, Dr. Moore chemically tacked on some radioactive iodine, converting it into diiodo-fluorescein. Small, calculated quantities of this were injected into the veins of patients suspected of having brain tu-

mors, who were to undergo operations.

In a short time the blood had been carried to their heads, where the counters detected the presence of the radioactive atoms. Some of the iodine was present all over the brain, but on the patients' heads there were certain spots where the counters ticked much more rapidly than they did elsewhere. This was taken as indicating the possible presence of a tumor beneath that spot on the skull.

Subsequent operations proved the radioactive spotting method to have been correct in a large proportion of the cases.

The method is not considered infallible, and is to be used only in connection with other methods of diagnosis. So used, however, it should eventually be helpful.

Science News Letter, June 5, 1948



GIANT METASEQUOIA — Dr. Ralph W. Chaney, at the foot of the "Dawn Sequoia," examines some of its twigs. With him is the commander of the armed escort provided by local Chinese authorities as protection against bandits.

DENDROLOGY

Find Ancient Tree Species

► A TREE species that flourished on the earth long ago, almost in the days of the dinosaurs, long supposed to be as dead as they are and known only from fossils, turned up alive a short time ago deep in China's almost inaccessible interior. Closely related to the Sequoias of California, it bears the name Metasequoia, testifying to its kinship.

Now the man who first gave the news of its discovery to the Western world, Prof. Ralph W. Chaney of the University of California, has been able to obtain specimens, seeds and photographs. His trip started by trans-Pacific airplane but wound up on foot, for the final 125 miles or so of the journey was over ancient Chinese "roads" that in reality are mere foot trails. Part of the way he was carried in a sedan chair by coolies, but a good deal of it he had to do on his own two feet.

Metasequoia grows in moist mountainous country, but never much above 4,000 feet elevation, for it seems unable to stand winter weather. Its reddish bark is much thinner than the thick, corky covering of its American cousins,

so it would presumably be less resistant to fire. However, the wet habitats in which it grows minimize that danger.

Biggest Metasequoia seen and photographed by Prof. Chaney stands 98 feet high and is nearly six feet in diameter 11 feet above the ground, where its flaring buttresses end. With typical Chinese reverence for all things old, the natives of the region have erected a small temple at its base.

Unlike the American Sequoias, which are evergreen, Metasequoia loses its foliage in autumn, after the fashion of the bald cypress and the American larch or tamarack. When Prof. Chaney visited it, early this spring, it was still bare. The tree is also unlike the American species in that its spreading branches grow upwards, not at a downward slope.

In addition to the venerable "grandfather" tree, which is several centuries old, there are a considerable number of others, ranging in size from finger-thick saplings to mature trees three feet or more in diameter.

Prof. Chaney has planted the seed which he brought back with him in

greenhouses, and with the cooperation of the Save-the-Redwoods League will see that the seedlings are set out in places where they will have best chances for survival. (See *SNL*, May 22).

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ARCHAEOLOGY

Early Natives of Britain Built Greek-Like Temples

► THE religion of early inhabitants of England, 2,500 years ago, was apparently influenced by the culture of far-off Greece at least in the form of its temples. Evidence of this was uncovered during the construction of London's new airport at Hounslow Heath, W. F. Grimes, director of the London Museum, reported in the American journal, *Archaeology* (Summer).

When the site of the new airport was selected, an air survey was made to spot any possible traces of prehistoric occupancy not noticeable from the ground. The photographs clearly picked out the outlines of an earthwork once popularly known as "Caesar's camp," but in recent decades all but obliterated by cultivation.

Skimming off the surface soil with earth-handling machinery, the archaeolo-

gists found the round outlines of a group of huts, of the type built by early Iron Age inhabitants of Britain about 500 B.C. At one edge of the village group they came upon postholes and a ditch marking where a rectangular building, quite unlike the huts, had once stood.

Detailed examination showed that this structure, presumed to be the town tem-

ple, had consisted of an oblong inner room, 18 by 13 feet in size surrounded by a row of pillars. This is the basic design of a Greek temple. Apparently these early natives of Britain had built in wood a fair replica though in reduced size of what the Greeks of the time were erecting in stone at the far end of the Mediterranean.

Science News Letter, June 5, 1948

ELECTRONICS-PHYSICS

Sound Detects Heat Waves

New instrument is called an acoustical interferometer and may be used to detect invisible light signals or short radio waves used in radar.

➤ INVISIBLE infra-red light, or heat waves, are detected by sound too high-pitched for the ear to hear by a new instrument revealed at the University of Illinois. It has practical as well as laboratory applications, such as the detection of invisible light signals, possibly in obtaining pictures not obtainable otherwise, and perhaps to detect the short radio waves used in radar.

The instrument is called an acoustical interferometer. It consists of two quartz crystals such as used in radio with a gas confined between them. A transmitter sets one crystal into vibration, and a receiver detects vibrations carried by the gas to the other crystal. When infra-red rays strike the gas they affect the vibration waves.

Certain types of quartz crystals have what scientists call piezo-electric properties. If a properly cut slice is pressed so as to flatten it slightly, opposite electric charges appear on the two surfaces. If the faces are pulled so as to thicken the slice, electrical charges appear in the reverse direction. In other words, vibration within the crystal sets up electrical energy. If electric charges are placed on the faces of the crystal, vibrations are set up within it which pass as sound waves

into the surrounding atmosphere.

In the new instrument, developed by Prof. W. J. Fry and his associates, the inaudible sound waves, called ultrasonic waves, are produced by connecting a radio transmitter to one quartz crystal and tuning the frequency to that at which the crystal vibrates naturally. The supersound waves set up travel through carbon dioxide containing water vapor or some other gas, to the other crystal, causing a vibration within it which produces tiny electrical impulses. These are amplified in a radio receiver and measured.

If invisible infra-red radiation is passing through the gas, it has an effect on the vibrations in it. Part of the light waves may be absorbed. The light that emerges may be examined to see how it has been changed by the gas in quantity and color.

A more important effect, however, is that of the light on the gas. The gas molecules are changed so that they absorb less of the sound waves passing between the two crystals. The infra-red modifies the sound so that the second crystal sends out changed electrical impulses to the radio receiver, and these may be instantly detected.

Science News Letter, June 5, 1948

BIOCHEMISTRY

Antibiotic from Bee Killer

➤ A GERM that brings wholesale death to honeybees may provide a strong weapon for the defense of human and animal health, it has been discovered at the bee culture laboratories of the U. S. Department of Agriculture at Beltsville, Md., by Dr. Eugene C. Holst.

The germ is the one that produces the serious disease of infant bees known as American foulbrood; its scientific name is *Bacillus larvae*. From it can be produced, either by direct extraction of the "scale" which it causes or by culturing on a nutrient medium, an antibiotic, or

drug of the same family as penicillin and streptomycin. The new antibiotic has not yet been formally christened.

Among the bacteria against which the new substance has been found effective, in laboratory tests, are those that cause boils, blood poisoning, septic sore throat, undulant fever, spontaneous abortion in cattle, and both human and bovine tuberculosis. It has an unusually wide range of effectiveness, although some germ species do appear to be resistant to it. Much more work on experimental animals is considered necessary before clinical use can be undertaken.

On his discovery, Dr. Holst has been granted U. S. patent 2,442,006, which he has dedicated to the free use of the people of the United States.

Science News Letter, June 5, 1948

ENGINEERING

New Thin Asbestos Paper Developed for Insulation

See Front Cover

➤ A NEW type of asbestos paper, thin as a human hair, has been developed by General Electric company of Schenectady, N. Y. It is for use as insulation in high-temperature electric equipment, and can easily withstand the flame of a blowtorch, as shown on the cover.

It is made of nearly pure asbestos and some mineral substance such as clay. It is free from any metallic matter which would lessen its value as an insulator. In an accelerated aging process equivalent to 100 years, this new insulator, which will be known as Terratex, retained its natural color and other physical properties.

Science News Letter, June 5, 1948

VETERINARY MEDICINE

Fourth U. S. Scientist Joins Foot-Mouth Group Abroad

➤ WHILE the Department of Agriculture completes final arrangements for acquiring an island off the state of Rhode Island, as a research center for foot and mouth disease, another American scientist has gone to Europe to join the war on the cattle menace.

Dr. Stewart H. Madin of the University of California is sailing for Europe to join three U.S.D.A. scientists who are already at work on the disease in European laboratories. Foot and mouth disease is prevalent in Europe, and several governments there have had laboratories working on the disease for many years.

The new U. S. research center being planned for Prudence Island off Rhode Island will be the first of its kind for this country. Because there is no foot and mouth disease in this country, the law authorizing the laboratory required that it be located on an island not connected with the mainland.

Funds for the purchase of the site are available, but a new appropriation will be requested from Congress for construction of the laboratory, which is expected to cost more than \$25,000,000.

Meanwhile American scientists are continuing to help Mexico in beating back the disease which is now estimated to be some 300 miles south of the Rio Grande at its closest occurrence to the U. S.

Science News Letter, June 5, 1948

CHEMISTRY

2,4-D More Potent When Combined With Latex

➤ 2,4-D kills plants more quickly and surely when it has the help of a synthetic-plastic latex known by the trade name of Geon 31X.

This has been discovered in experiments at Michigan State College reported by Drs. C. L. Hamner and Kiang Chi-Kien.

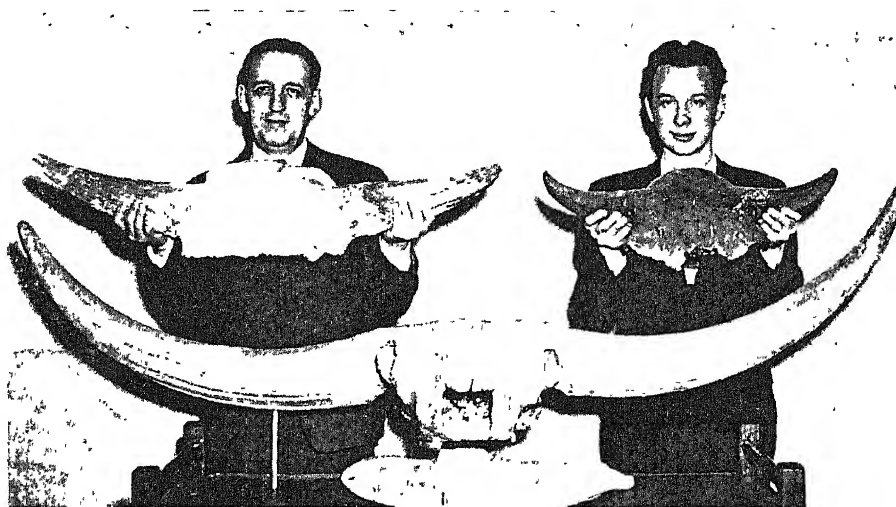
Kidney-bean seedlings were treated with the sodium salt of 2,4-D by dipping leaves into solutions of various strengths, from five to five hundred parts per million. Some of the plants were subsequently sprayed with the latex, while the rest were left unsprayed, as controls.

All the plants treated with the strongest solution of 2,4-D died, but those treated with weaker solutions and left unsprayed with the latex recovered and continued growth, after greater or less evidence of poisoning. But mortality in the plants treated with both 2,4-D solution and the latex spray was very high.

Then the treatment was tried on oat seedlings, which normally are not affected by 2,4-D, since they belong to the grass family. However, while those that received only 2,4-D showed no ill effects, those that were afterwards sprayed with the latex died as the bean seedlings had done.

The two experimenters do not know what the latex spray does to make the 2,4-D more effective, but suggest that by forming a covering film it may insure greater penetration of the tissues.

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DECLINE OF THE BISON—In front is shown the skull of half-million-year-old *Superbison latifrons*, 80 inches from tip to tip of the horn cores, while at the left is an intermediate form, *Bison antiquus barbouri*, in the hands of Dr. C. Bertrand Schultz. The dwarfed specimen at the right is a modern bull bison's skull, held by W. D. Frankforter.

PALEONTOLOGY

Early Bison Were Giants

➤ IF BUFFALO BILL had gone a-hunting in the Wild West of a half-million years ago he would have had to carry an anti-tank gun for a rifle. He would have had to take along Paul Bunyan to be his skinner, using a bulldozer blade for a knife. That's how big the bison were in those days.

The first of these great shaggy beasts that roamed the Plains had a spread of 80 inches—nearly seven feet—from tip to tip of his horn cores. Those are the measurements of fossil skulls of that age, found in river gravels of early Ice Age date, as measured by Dr. C. Bertrand Schultz and W. D. Frankforter of the University of Nebraska State Museum.

Horn cores are the bone supports over which the hollow horns of animals of the cattle family fit. The horn substance has disappeared from all fossil skulls thus far collected, so the actual horn-spread of these ancient giants can only be inferred; but a ten-foot spread would not seem excessive. If the rest of the animal was built in proportion, this earliest "thundering herd" must have been of near-elephantine size. No wonder that zoologists have suggested a new name for the ancient genus: *Superbison*, instead of merely *Bison*.

This particular species has been given the full name of *Superbison latifrons*, which means "broad-faced super-bison"

—an eminently justified title.

This earliest of known bison was also the biggest. All later species (and there were some giants in later Ice Age times) were smaller than this great-granddaddy of the herd. This seems to be contrary to the evolutionary history of other large animals: horses, camels, elephants, rhinoceroses, all started small and became larger in the course of their development, as fossil records show.

This seeming contradiction may be due to the fact that we do not have nearly as complete a fossil history of the bison as we have of some of the other animals, notably horses and elephants. Despite their distinctively American character, bison did not originate on this continent. The giants studied by the Nebraska paleontologists were immigrants from Asia, arriving via the land bridge that existed across Bering Strait in Ice Age times and never blocked by the ice which had its greatest development farther towards the east. So the earlier, and possibly humbler, ancestors of the bison may still be buried deep beneath Siberia's perpetually frozen soil.

Be that as it may, the various species of bison that have existed between Old Broadface with his seven-foot horn cores and the present-day bull bison with a mere two-foot spread became smaller and smaller as time went on.

Science News Letter, June 5, 1948

PALEONTOLOGY

Deformed Indian Skulls Flattened Deliberately

➤ INDIANS of Mexico and parts of the Southwest a few centuries before Columbus had a marked flattening of the top of the back of the head.

The flattening is believed to have been produced by deliberate pressure applied to the heads of infants. In one case, a sort of three-horned man was produced with the skull sticking up on two sides and the front.

Skulls of this type are now being studied by scientists at the Smithsonian Institution in Washington. They have reported that the practice, known as "lambdoid flattening," was very common in Mexico centuries ago and has been found as far north as Utah.

Science News Letter, June 5, 1948

CHEMISTRY

Better Rubber for Tires Made from Sugar and Soap

➤ SUGAR and soap are helping make better automobile tires, the American Chemical Society was told in Philadelphia by Prof. Carl Shipp Marvel of the University of Illinois. They are used in a so-called redox process in which synthetic rubber may be manufactured at freezing temperature.

The quality of GR-S, the synthetic rubber blended with natural rubber in all tire treads, has been greatly improved by the recent development of the amazingly rapid redox process, he said. This new method makes it possible to manufacture rubber at freezing or sub-freezing temperatures instead of at 212 degrees Fahrenheit, the conventional temperature.

The quality of GR-S and similar rubbers seems to go up as the temperature goes down. GR-S is essentially a combination of two petroleum compounds, butadiene and styrene, which are made to unite or polymerize by a chemical stimulant, or catalyst. In the redox process, the compounds are first emulsified with a soap, and the reaction is started by a type of sugar called the activator.

Science News Letter, June 5, 1948

AERONAUTICS

90-Passenger Transport Promised by British

➤ A GIANT airplane, capable of carrying 90 passengers or 12 tons of freight, will be ready for a test flight in less

than a year, it was revealed in London. It is one of the largest planes which the British aircraft industry is undertaking at the present time.

Two of the type are under construction. They are being built by General Aircraft, of Feltham, Middlesex, and the plane will be known as the Universal. Parts manufactured at Feltham will be assembled at the Southampton airport.

The Universal will have a wingspan of 162 feet, a height of 31 feet, and a length of nearly 100 feet. It will be powered by four Bristol Hercules air-cooled radial engines giving a total of 7,800 horsepower. Its cruising speed will be under 200 miles an hour, but fully loaded it will be able to clear a 50-foot obstacle in only a half-mile from the start of the take-off.

Some of the proposed Universals will seat 30 passengers on an upper deck and have space for some nine tons of cargo below. This is to satisfy demands where a combination passenger and freight airship is required.

Science News Letter, June 5, 1948

AERONAUTICS

Solve Aviation Mix-up On English And Metric Units

➤ A SOLUTION for the aviation confusion in international flying due to use of English and metric units in airplane communication has been worked out in Montreal by the International Civil Aviation Organization representing 48 nations, including the United States.

The plan, involving a proposed table of units, takes the form of an international standard to be incorporated into the legislation of the member nations. It proposes a condensation from five dimensional standards into one in a ten-year period. After New Year, 1959, complete world-wide standardization in aviation communication would be achieved.

When this standard is reached, distances would be given in nautical miles, altitudes in meters, horizontal speed in knots and vertical speeds in meters per second. Wind direction and velocity would be in degrees and knots, cloud heights in meters, and visibility in meters or kilometers. Altitude setting would be in millibars, temperatures in Centigrade and weight in kilograms. Time would remain the day, the day beginning at midnight, Greenwich mean time.

Science News Letter, June 5, 1948



GENETICS

Plant and Insect Changes Produced by Ultrasonics

➤ EVOLUTION of new varieties of plants and insects has been forced by treating parents' cells with sound waves too short and rapid to be heard by any ears, by a three-man research team in the laboratories of the University of Connecticut at Storrs, Conn.

Electrically driven vibrating crystals, producing ultrasonics at four hundred thousand cycles per second, were used on three different kinds of plants and on young fruit flies. Subsequent growth showed changes of kinds usually regarded as genetic, and microscopic examination of the cells confirmed this by displaying changes in the structure and arrangement of the heredity-carrying chromosomes.

A preliminary report on the work is given in *Science* (May 28) by Drs. R. H. Wallace, R. J. Bushnell and E. H. Newcomer, who state that more detailed accounts will be published elsewhere later.

Science News Letter, June 5, 1948

MEDICINE-BIOLOGY

AEC Announces Program of Study in Medicine, Biology

➤ A COAST-TO-COAST program of 38 research projects in medicine and biology to be conducted in 29 non-government laboratories was announced by the U. S. Atomic Energy Commission. The Commission has made available \$1,300,000 for the projects.

The subjects for the studies range from genetics of fruit flies and corn and the nutrition of tapeworms to cancer research and airborne infectious diseases.

Radiation-induced gene and chromosomal mutations in drosophila (fruit flies) and corn will be investigated at the California Institute of Technology, Pasadena. Research on the nutrition of tapeworms will be conducted at Rice Institute, Houston, Tex. The Memorial Hospital for Treatment of Cancer, New York, will study cancer and the distribution of isotopes in therapy. Work on airborne infectious diseases will be done at the University of California, Berkeley.

Science News Letter, June 5, 1948

ENGINEERING

Musicians and Designers Of Instruments Differ

➤ MUSICIANS and the engineers who invent new musical instruments do not always agree about music and its instruments. The controversy is being aired in the *Journal of the Acoustical Society of America* (Nov., 1947; May, 1948).

The inventor of several electronic musical instruments, B. F. Miessner, Morristown, N. J., recently complained that both musicians and the musical instrument industry "are extremely backward in accepting, manufacturing and using new instruments, or improvements of old ones."

In his letter to the editor of the *Journal*, Mr. Miessner concluded with the charge that "Music . . . is still where it was a hundred or more years ago."

Exception to this and other of the inventor's views is taken by H. L. Robin of the Juilliard School of Music in New York.

Mr. Robin argues that new electronic musical instruments "do not seem designed for constructive musical purposes."

As examples to support his argument, he lists:

"An organ which is less expensive than previous pneumatic types and which can be used in every small church or home.

"A violin whose intensity range far exceeds that of the conventional violin.

"A piano which, by the use of amplification, can be made to simulate an already existing piano tone."

These new instruments, Mr. Robin, suggests, were built for "extra-musical considerations."

Both Mr. Robin and Mr. Miessner agree that musicians and instrument designers ought to work together more.

Science News Letter, June 5, 1948

METEOROLOGY

Low Atmospheric Pressure Induces Fast Tree Growth

➤ THE LESS air there is over the Northern Hemisphere, the faster trees grow in the Far North. This curious correlation has been worked out by G. W. Brier, U. S. Weather Bureau sta-

tistician, who calls attention to the phenomenon in a letter to the editor of the British journal, *Nature* (May 8).

It is not generally known, but there is an actual migration of air from north to south in winter, and a return flow in summer. However, these annual atmospheric tides are not always equal, so that there may be a pile-up of air over one hemisphere, with a correspondingly lowered atmospheric pressure over the other.

This is what happened in the 40-year period from 1899 to 1939, with the pressure deficit remaining persistently north of the equator.

Science News Letter, June 5, 1948

NUTRITION

K-Ration Fruit Bar Is Made More Tasteful

➤ TOO late for millions of World War II GI's, scientists at the University of California College of Agriculture have made a better tasting version of the dried fruit bar in the Army's K-ration.

They added chopped toasted almonds and honey or corn syrup. The result is said to be a 100% more tasty bar.

GI fruit bars were about half raisins, with prunes, apples, figs, apricots and a little ground candied orange peel.

Dr. W. V. Cries and students John Brekke and Henry Seagrave-Smith have developed this new recipe: 20 parts Muscat raisins; 20 parts Calimyrna figs; 20 parts chopped toasted almonds; 20 parts honey or corn syrup; 15 parts dried apricots; and five parts candied orange peel.

Science News Letter, June 5, 1948

BOTANY-MEDICINE

Establish Herbarium To Study Hay-Fever Plants

➤ A NATIONAL hay-fever herbarium, in which will be gathered hay-fever-causing plants and their pollens from all over the country, is being established under the auspices of the American Academy of Allergy by the University of Illinois College of Pharmacy at Lisle, Ill., in connection with the College's proposed drug plant experiment station. The collection will be in charge of Prof. Ralph H. Voigt.

Physicians, botanists and other persons with scientific interest in hay fever and the plants that cause it will be able to obtain slides of positively identified pollens from the new collection, and to examine the pressed specimens there.

Science News Letter, June 5, 1948

CHEMISTRY

Semi-Plastic Coating for Brick Is Water-Repellent

➤ BRICK and other porous masonry surfaces are protected from moisture by a new semi-plastic coating, applied in a water solution by brush or spray, which becomes invisible after drying.

Unlike other types of invisible transparent surface coatings, which are usually solutions of waxes or stearates in inflammable solutions, this is an opaque, milky-white, non-inflammable water emulsion containing water-repellent organic ingredients. After application it becomes absolutely transparent.

The new product, first developed during the war and used by the armed services, is called Aquaphane and was perfected by Dr. Hugo Silbermann, an Americanized scientist from Czechoslovakia, now with International Aquella Products, Inc., Rockefeller Center. The material is not applicable to wood, metal, marble or other solid masonry work. When applied to common brick and other porous masonry it has long life and prevents water absorption from rain, dampness, snow and sleet.

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MEDICINE

To Test Anti-Malarials at Central American Airbase

➤ A CENTRAL American airbase of the Department of the Air Force is to be the site of a new attack on malaria.

Scientists of the U. S. Public Health Service will conduct a two-year test program on new anti-malarials at the Puerto San Jose Air Field on the Pacific Coast, 70 miles from Guatemala City, capital of that Central American country.

The project is hailed as the first opportunity to test new drugs against malaria in an area where the disease is prevalent. Workers at sugar and coffee plantations in the region will be given the drugs to help them fight the disease and assist scientists in evaluating the anti-malarials.

Dr. Charles G. Dobrovolsky of the Public Health Service will direct the program which will include both U. S. and Guatemalan scientists. Cooperating with the Public Health Service on the program are the Guatemalan government and the Pan-American Sanitary Bureau.

Science News Letter, June 5, 1948

GEOLOGY-ENGINEERING

Man-Made Fuels Needed Now

It will take a long time to find and extract all the crude oil from underground deposits, therefore synthetic liquid fuels are essential to supplement this supply.

By A. C. MONAHAN

➤ "SHALL I filler-up, mister, with this new synthetic gasoline? Understand it's made just right from coal, shale or natural gas."

It's a guess as to how soon the fellow at the filling station will be saying that. Or how soon you will be running your old or new car on gasoline, either oil-born or synthetic, mixed with ethyl alcohol—the kind that can be drunk.

The day when this will be possible is not too far in the future. The oil industry is preparing for it, and plants are under construction or being planned.

Methods for making synthetic liquid fuels are well known. Present costs are important factors, however. Before these synthetic products can compete on a price basis with the products of the natural crude oil more economical manufacturing processes must be developed. Otherwise the use of man-made fuels will await the higher prices that may be expected as crude oil deposits become harder to find and more costly to work.

Plenty of Petroleum

There is plenty of petroleum in the crust of the earth to last for many generations, many geologists believe. The problem is how to find it and how to get it out. Much of it is in the underwater continental shelf that extends from coastline far out beneath the sea. Much is in icebound areas north of the Arctic Circle. Then perhaps there are hidden deposits a mile or two deeper than the present known reserves.

To get oil from any of these sources will cost a great deal of money. In fact to discover oil deposits within the continental United States is a costly procedure and growing more so as time goes by. Geologists can locate areas favorable to oil deposits, but there is only one sure way to actually find oil. That is by boring, and well-drilling is expensive.

An exploratory well in the oil industry is a wildcat. Companies drill on the advice of geologists but the geologists are often wrong. If no oil is struck the well bored is a dry hole. Over 87% of the

5,000 American wildcats drilled in 1947 turned out to be dry holes. Of some 20,000 wildcats drilled in the past five years, considerably over four-fifths were dry holes.

In efforts to find deeply-hidden oil, many wells over 10,000 feet deep have been drilled. One at Fort Cobb, Okla., was carried down to 17,600 feet, or over three and one-half miles. It was not productive. Oil is being produced from the Gulf coast of Louisiana and Texas from below 10,000 feet, and in a few cases from below 13,000 feet. These deep wells cost from \$250,000 to \$350,000 each. Their cost, and the cost of all exploratory wells and geological surveys in search of oil is all finally borne by the consumers of the petroleum products.

Will Take Many Years

It will take many years to get the oil in known deposits out of the ground. This means that synthetic liquid fuels may be needed to supplement crude oil production long before the underground reserves are exhausted. Taking oil from underground is not like pumping it from a tank. It is distributed in tiny spaces in what are called oil-bearing sands, usually sandstone and limestone. It takes time for the petroleum to seep to the area from which pumped.

Some American oil fields have been producing for 80 years or more, and will probably continue to produce for another 20 years. Their daily production has of course greatly decreased. Oil was taken from most old fields as rapidly as possible before conservation practices were established, but nature through her own physical laws prevented their rapid and complete exhaustion.

The greatest untapped source of crude oil in the world is probably the continental shelves which one petroleum geologist estimates contain 1,000,000,000,000 barrels of oil. These submerged areas extending from a few to a few hundred miles out from shorelines under the oceans, have a geological history favorable to oil formation. Their national ownership inside the three-mile limit is unquestioned.

Beyond this limit, they have long been

open to anyone. Waters over continental shelves are fish-feeding grounds, and fishing fleets of all nations have used them without interference. Now the situation has changed. The United States claims the American continental shelf areas as under American jurisdiction for both fishing and mining activities. This claim is by Executive Order of Sept. 28, 1945. It interferes in no way with ordinary navigation.

Natural Gas

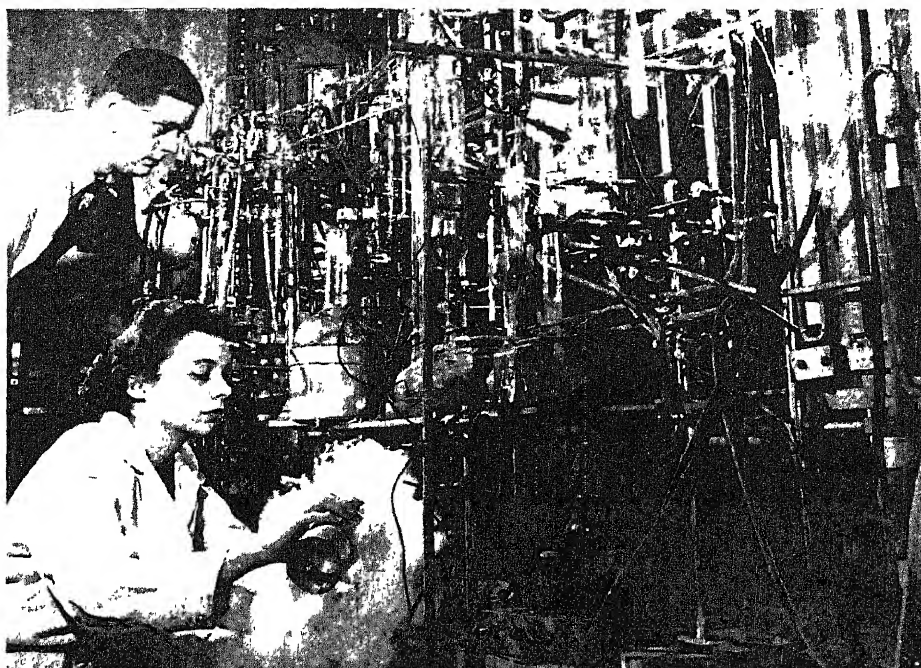
The first man-made gasoline and fuel oil to enter the American commercial market will probably be made from natural gas as a source material. Two giant plants, one in Texas and the other in Kansas, are now under construction for this purpose. The Texas plant will use gas much of which is now wasted, the Kansas plant will use a natural gas which has too low a heating value to use for ordinary gas heating or lighting.

Known reserves of natural gas have increased more rapidly than reserves of oil. Some state that there is enough to make quantities of gasoline from it for 25 years without endangering the supply needed for future years for heating and lighting. Others claim a much larger supply. One oil man recently stated that in Texas alone over 1,500,000,000 cubic feet of gas are being blown into the air every day. Its only present use is to assist in the production of oil.

The cost of gasoline from natural gas is relatively low. The products can be put on the market at prices competitive with those from natural petroleum. The investment in plant and equipment, however, is high.

The supply of shale containing oil, usually called oil shale, is very great. The largest deposit is in a Colorado area that extends well into Utah. But it is found also in California, Indiana and Kentucky. A U. S. Bureau of Mines pilot plant, now producing many barrels of oil a day, is located at Rifle, Colo., not far from the Utah line. There is enough oil shale in America to yield an estimated 95,000,000,000 barrels of oil if all could be extracted.

From work already done, it appears that oil from oil shales can be extracted even now at prices comparable to those for the average cost of production from wells. However, the product has different



SYNTHETIC FUELS—Radioactive atoms are used by Gulf Oil scientists in probing the still mysterious reaction by which gasoline is produced from coal.

characteristics and is better for production of diesel and other fuel oils than it is for gasoline and aviation fuel at the present time. New methods of refining may change this situation later.

Coal may be rapidly losing its right to be called the king of fuels, but it gives promise of being the father of fuels in the form of liquids. Coal for years has been the chief source of mechanical energy, but it took second place to oil and natural gas in 1946. Even for locomotives, coal is becoming secondary; over 90% of the locomotives now under construction are diesels, and one new diesel appears on the tracks every week to ten days.

Two Methods

There are two methods of producing synthetic liquid fuels from coal; the hydrogenation method and the Fischer-Tropsch process. Both have been used in Germany for several decades. Both are experimentally used in America, and developments already made are improvements on the German processes. The product is at least equal in quality to that being made from well oil, but the cost is still relatively high.

Laboratory work on the synthesis from coal is being done by the U. S. Bureau of Mines and by at least two coal and oil company combinations. The Bureau of Mines is building a large-scale demon-

stration plant at Louisiana, Mo., and a commercial plant is under construction near Pittsburgh.

Blending one gallon of ethyl alcohol with nine gallons of low-grade gasoline will make ten gallons of premium grade anti-knock motor fuel, Dr. G. E. Hilbert, of the U. S. Department of Agriculture, recently said. He is director of the department's regional laboratory at Peoria, Ill., where work is being done to develop liquid fuels from vegetable matter, particularly farm wastes. The advantage of a mixture of alcohol in gasoline for motor fuel has long been known but used relatively little because of the cost of the alcohol.

The process of making alcohol from grains for beverages and other purposes is well known and highly developed. Ordinarily there is not enough surplus grain to make alcohol from it for automobiles. But there are great quantities of corn cobs and other farm wastes from which ethyl alcohol can now be successfully made.

The cost is still too high, however, to use the alcohol as a motor fuel, but the outlook for a cheaper process is promising. One factor in cost is the transportation of the farm wastes to the alcohol-making factory. They are bulky to ship. Then to make a profitable business, uses for byproducts must be developed. Some could be used for making wallboard and

plastics, or even briquetted for household heating. Corn cobs, for example, yield such valuable byproducts as xylose, butanol, acetone and furfural. Among many uses for the last is in the making of nylon.

Despite the fact that the per capita consumption of petroleum products has risen from 367 to 608 gallons during the past nine years, that there are now a million more passenger cars on the road than in 1941, and that about 4,500,000 families are using liquefied petroleum gases for fuel, there is actually little danger that America will be without liquid fuels for centuries to come.

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ENTOMOLOGY

World's Food Crisis Made Worse by Insect Pests

➤ WORLD food shortages are being made worse by insect pests, which make hungry humanity eat at second table. With the world's population increasing at its present rate, our present tolerance of these thievings and spoilages must end, declared Dr. Fred C. Bishopp, assistant chief of the Bureau of Entomology and Plant Quarantine of the U. S. Department of Agriculture.

Dr. Bishopp spoke as guest of Watson Davis, director of Science Service, on *Adventures in Science*, heard over the Columbia network.

Much of the insect loss that used to be regarded as inevitable can now be prevented, thanks to DDT and some of the other new insecticides, Dr. Bishopp stated. Notable instances of successes already achieved which he cited are reductions in the hundred-million-dollar losses to the meat and dairy industries caused by tormenting flies, elimination of tick-borne cattle fever in the South, increase in the potato yield in Maine from 253 bushels per acre to 358, and the virtual elimination of houseflies from many cities and large areas in the country as well.

Although cotton is commonly thought of as a textile crop it is an important food crop as well, Dr. Bishopp pointed out, because of the oil from its seed and the seed meal that is fed to livestock. Cotton-attacking insects in one year cut the seed yield by 613,000 tons, worth \$44,000,000. This would have provided enough refined oil to make 200,000,000 pounds of margarine, meeting the minimum needs of 8,000,000 people. Cotton insects alone, therefore, are worth the

Do You Know?

The term *saran* applies to a series of resins chemically known as vinylidene chloride copolymers from which many plastic articles are made.

Flexibility is the property of *glass fibers* which distinguishes them from other glasses; they are flexible merely because they are exceedingly thin in relation to their length.

Electrochemical processes are being used more and more in industry for the preparation of a variety of materials such as chlorine and other gases; they are increasingly used also in refining metals.

The famous *Kensington stone*, so-called because found near Kensington, Minn., is now at the Smithsonian Institution, Washington, D. C.; its runic inscriptions purport to be the last message of a lost Norwegian exploration party perhaps massacred by Indians in 1362.

ORDNANCE

Shotgun Fired By Bringing Up Against the Shoulder

➤ A SHOTGUN that can be fired by merely bringing it sharply against the shoulder, without touching the trigger, is the subject of patent 2,441,787, granted to Ernest Zryd of Beloit, Ohio. A movable section of the butt-plate is linked to the trigger mechanism by means of a rod running through the butt; when this is pressed it fires the piece. It is thus possible to use the weapon with mittened hands in cold weather.

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waging of a major battle.

The world's unappeasable hunger for bread gives great importance to the fight against insects that attack stored grain, the speaker continued. We have been losing about 300,000,000 bushels of stored grain every year, worth more than \$600,000,000 at present prices.

CHEMISTRY

Urge Sharing of Isotopes

American scientific group proposes that the international office of the United Nations be empowered to distribute isotopes for research abroad.

➤ DISTRIBUTION of "non-dangerous" isotopes, by-products of the piles which are used to make atomic bombs, by an international office of the United Nations was proposed by the Federation of American Scientists meeting in Washington.

The Federation emphasized that the isotopes are important for research in medicine, agriculture and industry but are not useful for making atomic bombs. The suggested international office would set standards for the handling and naming of the isotopes in addition to serving as a clearing house for distribution of the material.

Although the U. S. has a near monopoly of these isotopes at present, the Federation report said that small uranium piles which can produce these important by-products are now operating in Canada and Great Britain.

"In France and probably the U. S. S. R., such piles are scheduled for early construction and operation," it was reported. Other countries listed as planning production of isotopes are Sweden, Norway, and India.

Setting up an office for international distribution of isotopes would aid the international exchange of scientific information, counteract ill feeling toward this nation by some scientists abroad and advance the peaceful uses of atomic research, the report contended.

Warning of a "disturbing change" in the attitude of some scientists in non-English-speaking countries toward the U. S., the report declared, "Upon investigation we believe most of the accusations and suspicions regarding American behavior to be unwarranted, but the circumstances are such that denial is difficult or impossible."

A system of international distribution of isotopes would bring about better un-

derstanding among scientists of many nations, the Federation argued.

The report suggested that an international organization such as the United Nations Atomic Energy Commission, the World Health Organization or the United Nations Educational, Scientific and Cultural Organization call an international conference on isotopes.

"We believe that the discussions might lead to an executive agreement or charter setting up an international office within the United Nations framework to deal with the distribution of isotopes," the report said.

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The Federation explained that distribution of isotopes by a UN group might not help in reaching an agreement in the control of atomic weapons, but the report said that an international institution operating in the field of atomic energy might "modify some viewpoints regarding control."

Prof. Arthur Roberts, physicist at the State University of Iowa and chairman of the Federation, said that "the proposal might well be undertaken by the United Nations Atomic Energy Commission if the General Assembly deems it advisable."

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SOCIOLOGY-PHYSICS

"Social Physics" Applies Laws of Gravity to Income

➤ A NEW science in which laws of gravity are applied to such matters as rents, land values or the national income was described to the Population Association of America meeting in Philadelphia by Dr. John Q. Stewart, associate professor of astronomical physics at Princeton University.

Although "social physics" is only in its early stages and not yet accepted as

a science, Dr. Stewart said that the principles of mathematical physics can be used in the social field.

Individuals are treated as molecules, he explained. Persons are given "molecular weights," in the way physicists have assigned weights to molecules and atoms. Some individuals have a "weight" of two, while individuals in some groups rate only one-third in the weighing.

With this system, Dr. Stewart has used equations of Newtonian gravitation in what he terms demographic gravitation. The results, which may come out in such units as "persons squared per mile," will show the national income or any of a large variety of other social statistics.

City suburbs, he explained, can be

compared with the satellites of planets in the solar system. When a satellite gets too close to a planet, it is torn apart. A village near a city "is drawn out in long lines in the direction of the overpowering attraction of the central city," he said, unlike the more isolated village built around a center, or nucleus.

Even the gas laws of physics can be applied to humans, Dr. Stewart contended.

Individuals want some living space of their own which gives the "human gas" a tendency to expand. Populations of cities, he suggested, are a compromise between gravity toward the centers of attraction and the expanding feature of gas.

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ENGINEERING

Low-Temperature Battery

Minus 100 degrees is the functioning capacity of new electric batteries now under development. They will have military as well as civilian applications.

➤ ELECTRIC batteries that will function at a temperature of 100 degrees below zero Fahrenheit are under development for the Army Signal Corps at Ohio State University, it is revealed. Experimental test cells which will operate at this temperature have already been constructed.

Batteries for use at extremely low temperatures have many military applications, but have civilian applications as well. High-flying airplanes in the stratosphere encounter temperatures from 60 to 70 degrees below zero. Guided missiles and the battery-powered radio-sonde, which is carried aloft to report weather conditions by radio, may meet even lower temperatures. Automatic ground-based weather stations in Arctic regions may be required to record and report the lowest temperatures found on the surface, and cold chambers used in research work sometimes have temperatures lower than any known that nature provides.

The selection of an electrochemical system was one of the first problems in developing a low temperature battery. It must be able to withstand long periods of storage under all atmospheric conditions, and not freeze at minus 100 degrees. The electrolyte must not disintegrate at normal or high heat, and also have the proper electrical characteristics to operate equipment at very low temperatures.

In the investigations already made, several solvents that possess the necessary characteristics have been uncovered. Solute-solvent systems were then studied to find good conducting mediums which would keep the internal resistance of the battery at a minimum when far below zero. Present research is directed toward electrode materials to determine the most suitable electrochemical couple, the proper combination of materials to produce electricity, for low temperature operation.

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CHEMISTRY

Benzene Hexachloride Found to Flavor Pork

➤ BENZENE hexachloride or 666, potent new insecticide, has been highly successful in ridding hogs of lice and mange; but it is inadvisable to use it on the animals just before they are slaughtered. Experiments in support of this conclusion were reported by Dr. R. H. Grummer, R. W. Bray and Dr. Gustav Bohstedt of the University of Wisconsin.

They treated three lots of pigs with the insecticidal dust, and part of them they also sprayed with a benzene hexachloride solution a short time before slaughtering them. Meat from recently-sprayed animals had "off" taste and

odor when tested by several judges. Cooking smells, described as "medicinal," persisted in the kitchen for a long time after the meat was prepared.

For these reasons, the three scientists recommend that no benzene hexachloride treatment be given hogs for at least ten days before slaughter.

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MINERALOGY

New Argentine Mineral Named for National Hero

➤ A NEW mineral has been discovered in Argentina and named after a national hero.

The mineral, called sanmartinite, was found southwest of San Martin. The name is for the city which in turn was named for Gen. Don Jose de San Martin, a leader in the fight for South American independence.

Sanmartinite is a zinc tungstate, first spotted in the study of a sample of tungsten ore. It is a member of the wolframite group of minerals.

First report of sanmartinite in this country was made to the Academy of Natural Sciences of Philadelphia by Victorio Angelelli, Argentine geologist, and Samuel G. Gordon, associate curator of mineralogy and petrology of the Academy.

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WILDLIFE

Porcupines Chew Glass, Gnawed Bottle Shows

➤ GLASS-EATING is not confined to a few humans with abnormal appetites; porcupines do it, too. So declares F. W. Preston, glass technologist of Butler, Pa., and to prove it he exhibits a catsup bottle with a hole chewed clear through one wall near the bottom. The unusual specimen was given to him by John Hopkins, a game warden in the hills near Clarendon, Pa.

On this and other bottles bearing porcupine tooth-marks, the animal had apparently set one pair of its chisel-like incisors against the edge, and forced the opposite pair towards it with its powerful jaw muscles, loosening small chips of glass.

Why the animals should want to chew up bottles is still unguessed, unless perhaps it is an appetite for small amounts of the alkali that leaches out of the glass on exposure to the weather.

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Sweets From Trees

➤ HONEY that you find on the market is most commonly labelled "clover honey" or "alfalfa honey." That is understandable enough, for there are enormous acreages in alfalfa and the various kinds of clover, and since every flower that is to produce merchantable seed must be visited by a bee, there is naturally going to be a lot of honey produced from their nectar.

However, there are a number of flowering trees that are copious producers of nectar, and that in their season are eagerly visited by bees. Their honey is not always identified for market purposes; but persons with a discriminating sweet tooth know their special fragrances, and will proclaim the virtues of their favorite tree honeys as connoisseurs enthuse about their pet wines.

Excellent honey is produced, for ex-

ample, from the nectar of tulip-tree flowers. The tulip-tree is abundant over most of the country east of the Mississippi, and although its flowers do not last long they produce a copious nectar-flow, enabling the bees to fill much comb with this type of honey in a short time. A related type of fragrant honey, sometimes met in the South, comes from the flowers of the tulip-tree's close kindred, the magnolias.

Of the South also, and the Southwest, is orange-blossom honey, which carries with it some of the fragrance of the flowers themselves. It is one of the lightest-colored of the tree honeys, a point in its favor so far as the market is concerned.

A hardy tree of the North, whose flowers are the source of a most excellently-flavored honey, is the linden or basswood. Its clustered little flowers are inconspicuously greenish but intensely sweet-scented, and while they are in bloom the bees simply go mad over them.

Many honey-tasters declare that the best-flavored of all honeys comes from the sourwood tree. This is a tree of rather limited distribution, being abundant only in parts of the Appalachian highlands, but where it does grow, and bees are given a chance at it, they will produce from its clusters of heather-like bloom a most unforgettable sweet.

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ASTRONOMY

Different Types of Light

Giant member of double-star in constellation of Auriga, emits most of its yellow light: smaller star responsible for large amount of total ultraviolet light.

➤ THE smaller member of a two-star team in the constellation of Auriga, the charioteer, has been found to contribute little to the yellow light emitted by the double star, but accounts for a large amount of its total ultraviolet light.

When the blue-type star of Zeta Aurigae is completely exposed, the percentage of ultraviolet light received from the double star is four times as great as during eclipse, reports Dr. Edison Pettit of Mount Wilson Observatory of the Carnegie Institution of Washington.

Although the percentage of yellow light sent earthward by the two stars is somewhat less when both stars are visible, the quantity of yellow light received is a little more than when the giant red star hides its smaller companion.

Zeta Aurigae is a fourth magnitude star, thus is visible with the naked eye in the base of that little triangle of stars near Capella.

The diameter of the giant red star, five and one-half times brighter than its blue companion, is 69 times as large as that of the smaller star and 200 times that of the sun, Dr. Z. Kopal of Harvard College Observatory has calculated.

During eclipse, the light from the smaller star is completely shut off for about 37 days. Three eclipses occur in eight years, one at the beginning of the year, one in August and one in May.

The withdrawal of light during

eclipse is much more noticeable when studied in some regions of the spectrum than in others. In visual light the variation is slight, being only 0.18 magnitude. In photographic blue light, the double star loses 0.68 magnitude at eclipse-time, Dr. Pettit reported to the Astronomical Society of the Pacific. But in ultraviolet, the light decreases two whole magnitudes when the smaller star is hidden.

A tenuous atmosphere surrounds the giant star. Like the corona around our sun, it extends about a diameter from the star's surface. Giant prominences, similar to the huge flame-like clouds of gas seen erupting from the surface of the sun, have been discovered on this star. The layer surrounding the star being semitransparent, the actual eclipse begins with a diminishing of light rather than as a sharp cutoff of brightness.

No diminution of the light of the blue star during the time it was passing behind the tenuous atmosphere of the giant red star had been detected in the past. During the eclipse last spring, however, the refrigerated photoelectric photometer that Dr. Pettit used showed that while the yellow light is not affected, the blue light of the blue star is diminished 0.07 magnitude and the ultraviolet light 0.12 magnitude. These quantities are too small to be readily measured by ordinary means.

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ADVANCES IN CARBOHYDRATE CHEMISTRY, Vol. 3—W. W. Pigman and M. L. Wolfrom, Eds.—*Academic Press*, 423 p., \$8.50. Containing contributions from England, Scotland, Sweden and Germany in addition to those from the United States.

BUTCH LEARNED THE HARD WAY—*Bureau of Labor Standards*, 16 p., illus., paper, free if ordered direct from Bureau of Labor Standards, U. S. Department of Labor, Washington 25, D. C. Safety rules enlivened by clever drawings.

CARTELS OR COMPETITION? The Economics of International Controls by Business and Government—George W. Stocking and Myron W. Watkins—*Twentieth Century Fund*, 516 p., \$4.00. Discussion of a problem having an important bearing on whether the United States can continue to maintain the system of free enterprise.

THE CHEMICAL CONSTITUTION OF NATURAL FATS—T. P. Hilditch—*Wiley*, 2d ed., 554 p., \$9.00. Including about 420 fats from plant species, about 80 from land animals and about 100 of aquatic origin.

COME TO THE ZOO—Ruth M. Tensen—*Reilly & Lee*, 26 p., illus., \$1.75. With the brief text planned to be easy reading for the beginner, this delightful book of photographs serves as an excellent introduction to the world of animals.

AN INTRODUCTION TO THE PHYSICS OF METALS AND ALLOYS—W. Boas—*Wiley*, 193 p., illus., \$3.50. Based on a series of lectures at the University of Melbourne.

IONOSPHERIC RESEARCH AT WATHEROO OBSERVATORY, WESTERN AUSTRALIA, JUNE, 1938-JUNE, 1946—L. V. Berkner and H. W. Wells—*Carnegie Institution of Washington*, 425 p., paper \$2.00, cloth \$2.50. Studies of the radio-reflecting layers of the upper atmosphere.

THE MAN IN THE STREET: The Impact of American Public Opinion on Foreign Policy—Thomas A. Bailey—*Macmillan*, 334 p., \$5.00. The author indicates that the American citizen has much more power than he may realize although many exercise their sovereignty in an ignorant way.

THE NEW INTERNATIONAL YEARBOOK: A Compendium of the World's Progress for the Year 1947—Henry E. Vizetelly, Ed.—*Funk & Wagnalls*, 683 p., illus., \$10.00. An alphabetically arranged chronicle which includes a physics section by the director of Science Service.

OCEANIC BIRDS OF SOUTH AMERICA: A Study of Species of the Related Coasts and Seas, Including the American Quadrant of Antarctica Based Upon the Brewster-Sanford Collection in the American Museum of Natural History—Robert Cushman Murphy—*Macmillan*, 1245 p., illus., 2 vols., \$17.50. New edition published by Macmillan of a book originally put out by the American Museum of Natural History. Beautifully illustrated.

PHOTOELASTICITY, VOLUME II—Max Mark Frocht—*Wiley*, 505 p., illus., \$10.00. In-

corporating new work done since the publication of Vol. I, including developments in 3-dimensional techniques of stress analysis.

PICTORIAL ASTRONOMY—Dinsmore Alter and Clarence H. Clemminshaw—*Griffith Observatory*, 288 p., illus., Fabrikoid \$3.00, Leatherette \$2.00. Suitable as high school or college text but pleasant reading and useful reference book for the layman.

WHAT IS PSYCHOANALYSIS?—Ernest Jones—*International Universities Press*, rev. ed., 126 p., \$2.00. Covering the history, content and applications.

THE REHABILITATION OF THE PATIENT: Social Casework in Medicine—Caroline H. Elledge—*Lippincott*, 112 p., \$2.50. How to help individuals like the boy who said, "I'm only 14 years old and I can't get along without my leg."

VOCATIONAL PLANNING: A Guidebook for Successful Careers—Frank S. Endicott—*International Textbook Co.*, 2d ed., 147 p., illus., \$1.60. By the director of placement at Northwestern University.

WAR, POLITICS, AND INSANITY—C. S. Bluemel—*World Press*, 121 p., \$2.00, A

discussion of the psychological qualities of political leadership and the disorders of personality with which aggressive leadership is commonly associated. The author is a practicing psychiatrist.

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ORNITHOLOGY

Hall of Bird Specimens Opened at N. Y. Museum

► BIRDS in the widest possible variety, ranging from two-inch hummingbirds of present-day tropical forests to ten-foot skeletons of the extinct moa of New Zealand, went on display at the American Museum of Natural History in New York with the formal dedication of the Leonard C. Sanford Hall of Biology of Birds.

The exhibits are arranged not merely with the idea of showing specimens of birds from all over the world, but to give some idea of how birds live and how they make their livings, how they get along with each other, and how they fit into their environments.

Science News Letter, June 5, 1948

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SIGNIFICANCE FOR AMERICAN WOMEN

Mrs. Alice Withrow Field, Supervising Probation Officer, New York City Magistrates Courts

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Dr. Joseph K. Folsom, Professor of Sociology, Vassar College

ARE KINSEY'S METHODS VALID?

Dr. Leo Crespi, Associate Professor of Psychology, Princeton University

PSYCHIATRIC ISSUES IN THE REPORT

Dr. Robert P. Knight, Austen Riggs Foundation

SEXUAL BEHAVIOR IN PENAL INSTITUTIONS

Dr. Robert M. Lindner, Consultant Psychologist,

Maryland State Board of Correction

SEXUAL PATTERNS AND THE LAW

Judge Morris Ploscowe, New York City Magistrates Courts

RELIGIOUS ASPECTS — A PROTESTANT VIEWPOINT

Rev. Seward Hiltner, Director Pastoral Services,

Federal Council of Churches

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New Machines and Gadgets

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✿ **FRANKFURTER COOKER**, for use on the dining table, is a plastic holder for three "hot dogs" with a covering lid of the same material. Closing the lid automatically throws a switch which permits the household electric current to flow through the frankfurters, cooking them from the inside to the outside in about two minutes.

Science News Letter, June 5, 1948

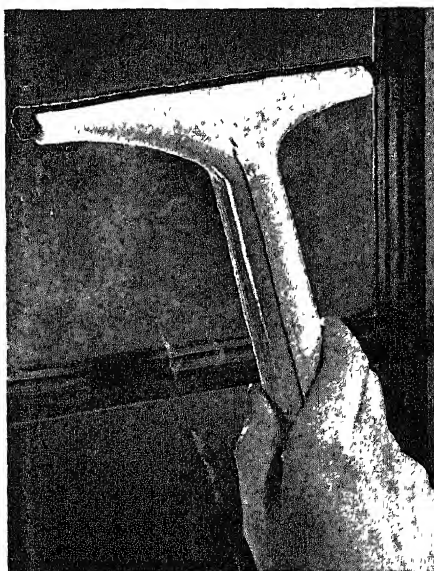
✿ **FUEL INJECTION PUMP** for automotive diesel engines is a single-plunger type with a single delivery valve to do the work formerly done by four or six plungers and delivery valves, depending upon the number of cylinders to be served. The complete pump is less than half the size and weight of present multi-plunger types.

Science News Letter, June 5, 1948

✿ **ALUMINUM CANDLES** are actually aluminum tubes tapered at the top to make them look like wax candles. The candle itself is on the inside with its wick projecting above, and as it burns, a coil spring under it pushes it upward to remain with flame exposed.

Science News Letter, June 5, 1948

✿ **WINDOW WASHER**, shown in the picture, has a hollow plastic handle which, when filled, feeds water through tiny holes into a felt blade. The device loosens dirt for easy removal with a soft cloth. Little water is used, and it can not



drip onto surrounding areas. A vent in the handle cap keeps the water flowing during use.

Science News Letter, June 5, 1948

✿ **BRITISH RADIO**, with the release of one bolt, opens like the petals of a flower, making all components easily accessible for servicing and testing. It is in a plastic-molded cabinet, the performance of which is claimed to be equal to wood.

Science News Letter, June 5, 1948

✿ **COMBINATION HAND TOOL** for electricians cuts off, without damage

to threads, the ends of any of the four sizes of machine screws most used in electrical work, and it also cuts and strips electrical wire. It is a pocket-size tool of high-strength alloy steel, fitted with shock-proof plastic grip handles.

Science News Letter, June 5, 1948

✿ **VINYLITE PLASTIC** bags are particularly suitable for shipping wet materials and also products of chemical companies where lint from ordinary bags might contaminate the contents. They are transparent, will withstand rough handling, and holes resulting from cutting can be easily and quickly repaired by heat-sealing.

Science News Letter, June 5, 1948

↓ To Order Any Book

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HERE OR ON SEPARATE SHEET.

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SCIENCE NEWS LETTER

Vol. 52, No. 24

THE WEEKLY SUMMARY OF CURRENT SCIENCE • JUNE 12, 1948



Malarial Shrew

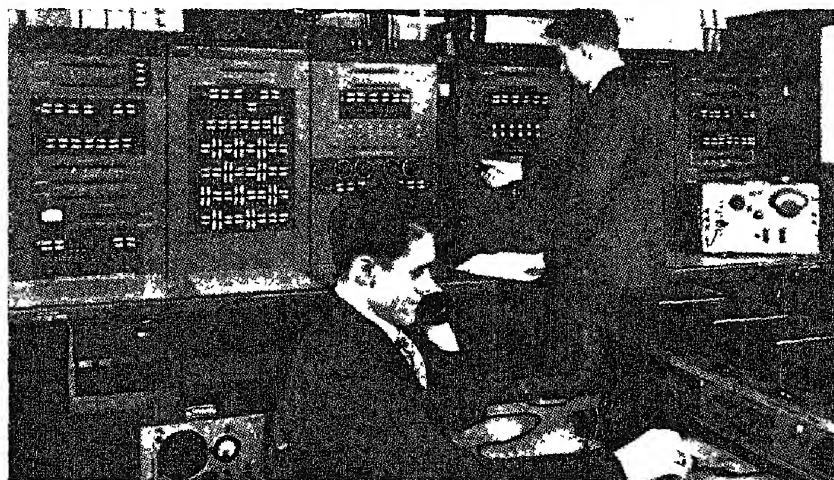
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A SCIENCE SERVICE PUBLICATION



These "sound jurors" record their preferences as they listen over test circuits.

Trial by "Sound Jury"



The engineer in the foreground talks over the test circuits which the other engineer sets up on a "circuit simulator."

AFTER Bell Laboratories engineers have designed a new talking circuit, they measure its characteristics by oscilloscopes and meters.

But a talker and a listener are part of every telephone call, and to satisfy them is the primary Bell System aim.

So, before the circuit is put into operation, a "sound jury" listens in. An actual performance test is set up with the trained ears of the jurors to supplement the meters.

As syllables, words, and sentences come in over the telephones, pencils are busy over score sheets, recording the judgment of the listeners on behalf of you and millions of other telephone users.

Targets of the transmission engineer are: your easy understanding of the talker, the naturalness of his voice, and your all-around satisfaction. To score high is one of the feats of Bell System engineering.

BELL TELEPHONE LABORATORIES

• EXPLORING AND INVENTING, DEVISING AND PERFECTING FOR
CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE



MEDICINE

Hopes Dim of KR as Cure

The Russian anti-cancer serum, tested on over 1,300 mice in this country, has given negative results after three years of experimentation.

➤ WHAT seems to be the death knell for hopes of a cancer cure from the Russian KR anti-cancer serum is sounded in a report to the journal, *Science* (June 4).

The report is by Drs. Theodore S. Hauschka and Margaret Blair Goodwin, of Lankenau Hospital Institute for Cancer Research, Philadelphia. Since March, 1945, these scientists have been testing, in over 1,300 mice, the Chagas' disease germ material reported by two Russian scientists to be effective against cancer.

"In view of the almost wholly negative outcome of our experiments and those of others the elusive endotoxin of *T. cruzi* does not at present appear to hold out much promise for cancer therapy," they state.

T. cruzi are the trypanosomes, or germs, of Chagas' disease. According to the Russian scientists, Dr. N. G. Klyueva and her husband, Dr. Gregory Roskin, blood of animals infected with these germs contains a poison, or endotoxin, which has anti-cancer action.

The Philadelphia scientists duplicated as closely as possible the Russian techniques in preparing and using the material. But it did not have any effect on the cancers in the mice and in one set of experiments more treated mice died than untreated ones.

Shortly before his death, the late Dr. W. M. Malisoff of New York reported that he had verified the Russian results and was going to use his material for treatment of patients. The Philadelphia scientists also repeated his work, using germs he furnished, and mice implanted with cancers from the same source he used. Dr. Hauschka and associates found that in more than half the mice these cancers grew smaller without treatment, so that Dr. Malisoff's results can be considered spontaneous regressions of the cancer and not the result of the treatment.

The work of the Philadelphia scientists has been done in a joint research program with the National Cancer Institute under a grant from the Institute. Since the scientists are convinced that the

Chagas' disease germs do not produce an anti-cancer material, they will stop further work along this line. But they will probably continue studies aimed at finding out why the Russian scientists thought they had anti-cancer material. There is a possibility that their results were due to chemicals from some other germs which might have been in the blood they used to prepare their endotoxin.

Science News Letter, June 12, 1948

BACTERIOLOGY

Penicillin Action Appears To Produce Electric Field

➤ PENICILLIN'S action against bacteria appears to create a charged electrical field in the area where it is going on.

Drs. Jean Dufrenoy and Robertson Pratt, of the University of California Medical Center in San Francisco, produce evidence that in the zone where the drug is inhibiting bacterial growth there is a positive charge, with a negative charge in the area where the growth-rate is enhanced. They have communicated their findings to the editor of the British scientific journal, *Nature* (May 29).

Science News Letter, June 12, 1948

AGRICULTURE

Scientific "Calf Starter" Will Add to Milk Supply

➤ SCIENTIFIC "calf starter" for dairy-men is one way to increase the supply of milk and milk products for home use and for shipping, says Prof. W. T. Crandall of Cornell University's animal husbandry department.

Calf starters, or milk substitutes to be fed dry, are marketed by a number of feed companies as meal and pellets. Dairy-men who use them in raising their calves can save 850 pounds of milk on each calf.

Prof. Crandall explained it this way. Only 350 pounds of whole milk is required for each calf with the calf-starter method, as compared with 1200 pounds

of whole milk when no milk substitute is used.

This saving can do much to increase the supply of market milk, he pointed out. The calves also make good gains in size and feeding capacity when they get good quality hay in addition.

Calves in the Cornell University herd have been raised satisfactorily with calf starter for years.

Science News Letter, June 12, 1948

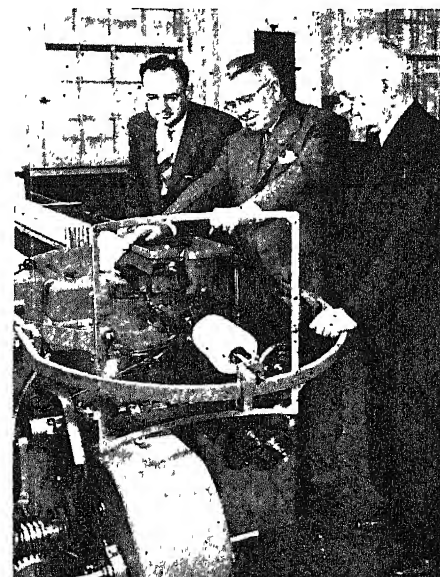
TECHNOLOGY

New Weaving Machine Speeds Up Cloth Output

➤ A NEW high-speed weaving machine demonstrated in Cleveland has produced cloth at 2.66 times the output of conventional machines and may be able to weave some yarns at a faster rate.

The bulky wooden shuttle is replaced by a light-weight steel gripper shuttle, and steel guides are used to keep the shuttle from touching the warp yarn. The new precision machine is in the last stages of development by The Warner & Swasey Company of Cleveland. It is based on the original design of a Swiss firm, Sulzer Brothers of Winterthur.

Science News Letter, June 12, 1948



WEAVING MACHINE—This is a pilot model designed to produce cloth at 2.66 times the rate of conventional machines. Key figures in the program responsible for this development are (left to right): D. M. Pattison, Charles J. Stilwell and Myron S. Curtis of The Warner & Swasey Company.

ELECTRONICS

New Symbols for Numbers

➤ A NEW set of symbols for numbers instead of the familiar 1, 2, 3, etc. has been proposed by a British scientist. His idea is to speed up the "reading" and "writing" of new high-speed electronic computing machines.

W. G. Bickley of Imperial College, London, offers a series of straight-line semaphore numerals. The new computers which can solve a mathematical problem in a fraction of a second that might require hours or days for a human computer to do must perform all the "three R's," Mr. Bickley explains in a letter to the editor of the journal, *Nature*. (May 8).

These robot mathematicians might be able to read a problem and write the answer faster with a simple, new set of numerals which humans could also use easily.

In the suggested system, 5 becomes a

straight vertical line, resembling the common figure 1. The symbol for one is shaped like the point of an arrow facing to the right, the sign which the mathematician uses to indicate "greater than." The figure 9 is the reverse of this. Other single-stroke or angled-line symbols are given for each of the other numbers, while zero would be a dot in the middle of the line. The new figures resemble straight lines drawn to indicate the position of the semaphore flags used by a signalman.

Mr. Bickley explains that high speed electronic "brains" seem to be faster at doing the arithmetic of a problem than they are at their input—putting the problem into the machine—and output—getting the answer out. The new code of figures might be easier for the "low-grade intelligence of the robot to recognize," he points out.

Science News Letter, June 12, 1948

GENERAL SCIENCE

Urge No Secret Work Plan

➤ A SCIENTIST urged that no secret research should be done under the proposed new National Science Foundation.

Dr. Hugh C. Wolfe, physicist at the City College of New York, told the House Committee on Interstate and Foreign Commerce that the Foundation should encourage free exchange of information by not undertaking projects coming under military security classification.

"The extension of security to new areas of science, particularly basic science, is a source of serious concern to nearly all scientists," Dr. Wolfe cautioned in a statement which he presented as a spokesman for the Federation of American Scientists.

He proposed that legislation establishing the Foundation be amended to provide that the new agency "not . . . give continuing support to research requiring security classification." When work under the Foundation required such a status, it would be transferred to another group under this proposal.

A bill to establish the Foundation is now in the House Committee after having passed the Senate. Last year, President Truman vetoed a measure calling for the Foundation.

The Foundation which would give

peacetime, civilian support to basic research in science was supported by testimony of Prof. J. A. Reyniers, bacteriologist at the University of Notre Dame. He told the committee about his own work of rearing germ-free animals and warned that any delay in basic research multiplies future problems.

Dr. Lawrence R. Hafstad, executive secretary of the Research and Development Board, advised against limiting the Foundation to only basic research. In some cases, he explained, it might be wise for the Foundation to enter the field of development as well.

Other witnesses before the committee included Secretary of Commerce Sawyer, making his first appearance before the Commerce Committee since his appointment to the cabinet, and other representatives of business, education and science.

Science News Letter, June 12, 1948

PHYSIOLOGY

Incubator Eggs Need Extra Oxygen at High Altitudes

➤ MORE successful hatching of chicks and turkey poults on high-altitude ranches can be achieved by piping oxygen into the incubators, it has been

discovered at the University of Wyoming.

A baffling problem of poultry-raisers in the mountain states always has been the relatively low percentage of eggs that turn out healthy baby fowl. University poultry researchers found that at 7,000 feet elevation not enough oxygen got through the eggshells to keep the developing embryos alive; the poor unhatched chicks literally smothered to death. Supplementary oxygen was the answer.

Oxygen must be supplied throughout the entire incubation period, it was learned. If it is supplied for a time and then discontinued, results are worse than if it is not given at all.

Science News Letter, June 12, 1948

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MEDICINE-ZOOLOGY

Shrews Aid Malaria Fight

Medical research is expected to benefit from the discovery that elephant shrews, 104 of which have been imported from Africa, are susceptible to this disease.

See Front Cover

➤ NEWEST reinforcements in science's war against malaria are 104 elephant shrews, which have just been installed at the National Zoological Park in Washington, after a fast air journey from their home on the upper Nile, in the Anglo-Egyptian Sudan. They are the size of big mice, and get their name from the long, flexible, rubbery tips on their nervous little exploratory noses, as shown on the cover of this week's *SCIENCE NEWS LETTER*.

Their great value to medical research lies in their susceptibility to malaria, and to the fact that they are small and not too hard to feed. Insect-eaters in their wild state, in captivity they have taken readily to a diet of oatmeal porridge, chopped hardboiled eggs and finely ground meat.

Malaria susceptibility is rare and spotty among mammals, so that the discovery that elephant shrews can have the disease marked them as desirable research material. The Navy sent a small group of scientists to Africa as part of the University of California expedition now there under the leadership of Wendell Phillips.

The animals were captured in snares

by natives near the settlements of Torit and Kapota, and were brought out by a three-man team: Chief Pharmacist's Mate Deaner Lawless and Messrs. Trenten Ruebush and William Terry. The 8,500-mile air journey, with one stop at Fort Lyautey in northern Africa, did not seem to bother the shrews at all.

They were caged in pairs for the journey. Shrews are cannibalistic and had numbers of them been caged together, there would not have been as many at the end of the trip as there were at the start. But a male and female traveling together do not try to chew each other up.

First steps in research on the elephant shrews were made in the Zoo's laboratories by Dr. Clay Huff of the Naval Medical Research Institute. Dr. Huff is examining samples of the animals' blood to find the species of malaria parasites with which they may be infected. He will try to transfer these to commoner and cheaper experimental animals such as mice, rats and hamsters. An effort will also be made to get the shrews to breed in captivity, thereby obviating the need for further expensive importations from Africa.

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of the Dominion Agricultural Department, Ottawa, in a discussion of possible guides to bird migration. Steering by the stars is possible; but there is the difficulty that birds often fly long distances when stars are hidden by dense overcast. Steering by winds will hardly do, Dr. Savile points out, because winds are variable in both direction and force. Effects of the earth's rotation on gravity as perceived by the sensitive balancing organs in birds' ears are possible—but not proven.

Dr. Savile points out that birds' homing instincts—that is, their ability to find their way back to their nests—are not necessarily connected with their sense of direction on long migratory flights. There is fair evidence that homing birds rely on recognizable landmarks; but on most migratory flights the young birds, which have never made the journey before, fly first—and they keep as true a course as their elders who follow them.

Both scientists agree that before very positive opinions about bird migrations can be put forth with much confidence it will be necessary to get far more information than we have at present. Dr. Savile suggests following migratory flights with airplanes or radar, at least for the first few hundred miles.

Science News Letter, June 12, 1948

ORNITHOLOGY

Magnetism No Guide

➤ BIRD migrations are not guided by the earth's magnetic field, as has recently been suggested, in the opinion of Prof. G. H. Henderson of Dalhousie University at Halifax, N. S. Serving on a mine-sweeper in Canadian waters during the war, he had many opportunities to watch birds exposed to intense magnetic fields set up by the vessel in its search for enemy mines, and he reports that the behavior of the birds was not affected in any way.

Prof. Henderson states in *Science* (June 4): "If birds were guided in their navigation by geomagnetic phenomena, it would be expected that their behavior would be affected when they flew within

several hundred yards of mine-sweepers. Yet nothing of the sort has so far been observed with such migratory birds as herring gulls and ducks or with non-migratory birds . . .

"When present, birds appeared to be supremely indifferent to magnetic fields, even at the sudden beginning of magnetic pulsing. A sweeper might pass close to a group of gulls or ducks sitting quietly on the water, yet they would completely ignore any surprise which man might provide, except for food. Again, a flight of ducks might pass over the sweep with no sign of a tailspin!"

Prof. Henderson is joined by another Canadian scientist, Dr. D. B. O. Savile



BABY PENGUIN—Hiding under its mother's flipper, this new Humboldt penguin is five inches long and the first to be hatched at the National Zoological Park in Washington in ten years.



EDIBLE OILS—A Venezuelan weighs oil-rich palm nuts collected by the FAO mission to Venezuela.

AGRICULTURE

Amazon Rich in Food Oils

➤ VAST untapped sources of oils for margarine, cooking fats and soaps lie in the wild forests of the jungles of Venezuela, a mission of the Food and Agriculture Organization of the United Nations discovered in a survey made at the request of the government of the South American country.

FAO scientists estimate that if all the edible oil in the Amazon region could be harvested, it would suffice to supply the entire world.

Instead edible oils are one of the crucial shortages in the world's food supply. Even Venezuela, rich in palms, coconuts and other sources of edible oils, imports much of its requirements.

That country already cultivates oil palms, but the wild regions are rich in unharvested nuts. Part of the FAO mission's job was to advise on better methods of growing the cultivated palms and extracting the oils.

The people are quite enterprising in cultivating the plants. They are growing coconuts and African palms and are beginning to cultivate sesame, sunflowers, peanuts, castor beans and others. The mission made a special study of cultivation of the African palm. Another species is the American oil palm, close cousin to the African palm, which grows

wild in large numbers from Brazil to Central America. One of the special features of the American oil palm is that the oil extracted from the fruit-pulp is very rich in vitamin A.

The jungles of the tropics were surveyed from the air. Aerial photographs of specific areas were taken, from which the palms could be recognized and accurately counted.

The mission made expeditions into the jungle by boat and jeep to identify the species and to gather sample nuts. From these specimens, scientists could estimate the annual production of the fruit per palm, the weight of the fruit, the percentage of oil in each fruit and the exact chemical content of oil in the nut. With these figures, estimates can be made on just how much oil lies in the tropical palm groves.

If the Venezuelans go ahead and tap these large resources, they must solve many problems. These include labor supply, health conditions and transportation. Machines will be needed to crack the hard shell surrounding the oil-bearing pulp. New methods of extracting the oil are being investigated.

New supplies of edible oils for a hungry world may come from today's wild jungles.

Science News Letter, June 12, 1948

AERONAUTICS-ENGINEERING

New Airplane Ice Detector Gives Pilot Danger Signal

➤ GREATER safety for private airplanes is promised in a new carburetor ice detector revealed by the Lindberg Instrument Company, Berkeley, Calif. When dangerous ice begins to form in the engine fuel induction system, a neon light flashes on the instrument board.

This gives the pilot ample warning in time to turn on his preheater, and thus avoid the danger of engine choking and a crash landing. The ice-choking of engines in flight is not a rare occurrence. Over one-fourth the engine failure accidents in planes during 1946 were due to icing conditions, according to the U. S. Civil Aeronautics Board. These occurred principally in the light plane field, and might have been avoided if the new device, which costs less than fifty dollars, had been available.

This Lindberg ice detector uses a so-called pick-up probe properly placed in the fuel induction system where the dangerous types of ice form. The energy required to power the ice detector is secured by electrical action from one of the spark plug leads, captured by slipping a piece of metal braid over the lead.

This energy is fed to a radio-frequency transformer which selects only the very high frequencies in the spark current and couples this energy to a balanced bridge circuit containing two condensers. One of these is a neutralizer, the other the ice probe itself. When ice forms on the pick-up probe, the circuit becomes unbalanced, and the warning flash results.

Carburetor ice can form at temperatures as high as 85 degrees Fahrenheit in clear weather, according to John Lindberg, Jr., one of the inventors of this device, and also the inventor of a well-known engine analyzer for multi-engine aircraft. The outside air temperature and moisture content are important factors, but when fuel is introduced into the airstream of aircraft induction systems, the vaporization of the fuel and other actions may cause as much as a 55 degree temperature drop.

This new ice detector has been subjected to laboratory and flight tests. Present models have been developed to use with Continental engines, widely used in private aircraft, but other models will be available soon for other engines.

Science News Letter, June 12, 1948

GENERAL SCIENCE

Top Scholarship Increased

Most promising young scientist with research ability in the Eighth Annual Science Talent Search will receive \$2,800. Total of \$11,000 in scholarships will be awarded.

➤ A HIGH SCHOOL senior will be named in 1949 as the most promising young scientist with research ability in America and will receive a scholarship of \$2,800 to continue his education.

This increased top scholarship in the Eighth Annual Science Talent Search for the Westinghouse Science Scholarships was announced by Watson Davis, director of Science Service, which administers the Science Talent Search annually through Science Clubs of America.

This \$2,800 Westinghouse Grand Science Scholarship is the largest ever given in the annual Science Talent Search. Thirty-nine other Westinghouse Science Scholarships ranging in size from \$100 to \$2,000 will also be awarded. This makes a total of \$11,000 in scholarships for seniors in public, private and parochial secondary schools throughout the United States. The competition is now open and will close midnight, December 27, 1948.

Preparing for Entry

Boys and girls, planning to compete in the Eighth Annual Science Talent Search, are already beginning serious preparation of their entries. They must take a three-hour science aptitude examination in their home school, submit scholastic records and recommendations and write an essay of about 1,000 words on "My Scientific Project." The latter requirement will take up much of the leisure time of thousands of 'teen agers this summer as they plan and carry through their experiments and research in libraries, workshops, laboratories and out of doors. Since projects may cover any phase of science they will range through the whole gamut of science from aeronautics to zoology.

Approximately 16,000 high school seniors are expected to enter the Eighth Annual Science Talent Search. About 3,500 will complete the rigid requirements. From these, 300 will be selected by the judges and named for Honorable Mention. All will be recommended to the colleges, universities or technical schools of their choice and are assured offers of financial assistance for further study from institutions seeking students

of outstanding science ability.

The top 40 boys and girls will be invited to Washington, D. C. for the five-day Science Talent Institute next spring. They will meet and talk with nationally known scientists, visit places of scientific interest and learn of new developments in science. At the end of the five days the judges will announce the winners of Westinghouse Science Scholarships ranging from \$100 to \$2,000 and will name the best young scientist in the United States to receive the Westinghouse Grand Science Scholarship of \$2,800. The 40 winners may use their Westinghouse Scholarships at any college, university or technical school they choose.

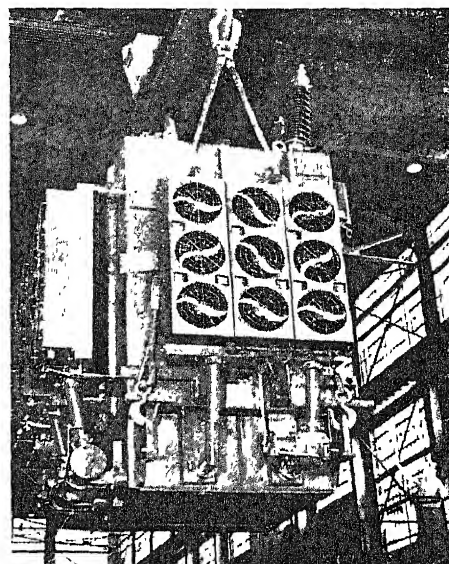
States Hold Competitions

High school seniors in some states will have a double chance to win scholarships through state Science Talent Searches run concurrently with the national competition and by special arrangement between Academies of Science and Science Clubs of America. Eleven states carried out this plan in 1948 and two more will be added for the Eighth Annual Science Talent Search. States which now hold competitions are Alabama, Georgia, Illinois, Indiana, Iowa, Louisiana, Minnesota, Montana, Pennsylvania, Tennessee, and Virginia. For the Eighth Science Talent Search, Michigan and Wisconsin will also participate.

The judges of the Science Talent Search are: Dr. Harlow Shapley, director of the Harvard College Observatory and president of Science Service; Dr. Rex E. Buxton, Washington psychiatrist; Dr. Harold A. Edgerton, vice president of Richardson, Bellows, Henry & Co.; and Dr. Stuart H. Britt, manager of Research and Merchandising, McCann-Erickson, Inc. The latter two have designed the science aptitude examination for the annual Science Talent Searches.

The Science Talent Search is conducted by Science Clubs of America, administered by Science Service. It is made financially possible by the Westinghouse Educational Foundation of the Westinghouse Electric Corporation.

Science News Letter, June 12, 1948



GIANT TRANSFORMER — Rated at 110,000 kilovolt-amperes, this powerful machine can handle enough power to fill all the electrical needs of an average city of 200,000 persons.

ELECTRONICS

New 140-Ton Transformer Will Be in Operation Soon

➤ A GIANT electrical transformer, claimed to be the most powerful ever built in this country and capable of turning out 150,000 horsepower of electrical energy, will soon be at work in a steam generating station of the Buffalo Niagara Electric corporation, it was revealed.

The transformer, which weighs 142 tons, was built by Westinghouse Electric Corporation, and is featured by its so-called form-fit tank design. This new type of design decreases the weight by about 20% of what would be necessary in older designs. It is rectangular in shape, and closely fits the core and coil assembly.

The giant will be used to take power at 13,200 volts and build up this voltage to 115,000 volts to be fed into the systems transmission network. The great heat generated in the core and coils will be removed by an oil-cooling system in which the oil itself is cooled by circulating air forced through the radiators by propeller-like fans.

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The Caddo Indian linguistic stock was probably the most used in what is now Oklahoma when white men first visited the region.

MEDICINE

Polio Fighters Are Being Mobilized for Outbreak

➤ POLIO fighters all over the country are being mobilized now in preparation for the usual summer outbreak of this crippling childhood disease.

In a series of 300 "grass roots" conferences, public health and hospital officials and other professional personnel from each community will be brought up to date on latest methods for fighting the disease. From two to a dozen conferences will be held in each state. The conferences are sponsored by the National Foundation for Infantile Paralysis.

It is too early to say yet whether there will be a big epidemic of the disease this summer. And there is no specific cure for it, nor any way of preventing polio epidemics, Basil O'Connor, president of the National Foundation for Infantile Paralysis, pointed out. But, he said, "we have learned that early diagnosis and prompt modern hospitalization can do much to halt the ravages of this crippling disease."

The preparedness meetings are being planned so that hospital beds, special equipment and trained personnel will be available for emergencies and so that health and medical authorities will know where to get nurses and physical therapists and about the National Foundation's epidemic aid teams and emergency equipment pools.

For the first time, Mr. O'Connor said, pools of equipment such as respirators (iron lungs) and hot pack machines will be strategically located at San Antonio, Tex.; Atlanta, Ga.; Boston; Columbus, Ohio; and Denver.

Science News Letter, June 12, 1948

FORESTRY

Baldness Attacks Young Evergreens in Lake States

➤ BALDNESS is afflicting small evergreens in northern states. Fortunately, however, it is unlike human baldness in that it is only temporary, and is due to a spell of unfavorable weather last year, rather than to anything inborn. The condition has been investigated by Dr. Henry Hansen of the University of Minnesota forestry department.

Last October there was severe drought in the region, followed by a sudden snow and sleet storm early in November. This, states Dr. Hansen, prevented the trees

from hardening their tissues as they ordinarily do in autumn. The sudden drop in temperature caught their needles unprepared.

In most cases, he explains, damage is confined largely to the needles grown in 1947, which have browned and dropped off. Now that new needles are growing, the trees' appearance has improved somewhat, although the gaps on the twigs behind the new growth will keep them looking a bit ragged for another year or two.

"Nothing can be done to remedy the condition, other than let nature take its course," Dr. Hansen states. "Spraying will not help and pruning is not recommended."

Damage is confined largely to non-native trees such as Scotch pine, Norway spruce and Oriental arbor-vitae. Trees belonging to the West, including Douglas fir, Colorado blue spruce, concolor fir and ponderosa pine, have also suffered. Trees native to the northern Great Lakes region, such as jack pine, Norway pine, white pine and white spruce, had least damage.

Science News Letter, June 12, 1948

GENERAL SCIENCE

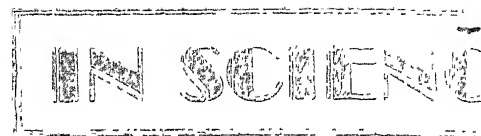
Patent Applications Filed By U. S. Government Abroad

➤ OUTSTANDING American wartime developments in radar and electronics are included in a new list of patent applications now filed in foreign countries to protect American interests. They are filed under the foreign patent protection program operated by the Office of Technical Services, U. S. Department of Commerce.

The new list, the fourth to be issued, contains 70 cases filed in Great Britain by the Federal government on its own behalf, and are now being opened for "follow-up" by private firms. Sixty-one of these have never been brought to public attention before. They range from landing aids for planes to developments in ultra-high-frequency circuits and antennas.

Licenses under any foreign patents received for these federal-owned inventions would be available to American nationals on a royalty-free, non-exclusive basis. Complete information, including an opportunity to examine the specifications of all foreign patent applications, are available in the Commerce Department building, Washington.

Science News Letter, June 12, 1948



CHEMISTRY

Radioactive Bromine Used In New Local Anesthetic

➤ RADIOACTIVE bromine is used in preparing a new local anesthetic, dibromo procaine, Dr. Frank Howarth of the Victoria University of Manchester announces in the British journal, *Nature* (May 29). The radioactive bromine was of British origin, made on the cyclotrons of Liverpool and Cambridge Universities.

Science News Letter, June 12, 1948

ARCHAEOLOGY

Age Discoveries Made by U. S. Expedition

➤ THE recovery of two stone age skeletons and tools from the west side of Lake Rudolf in Turkana Province is reported by the University of California African Expedition party in Kenya.

The skeletons were excavated under the direction of Prof. P. E. P. Deraniyagala, director of the National Museums of Ceylon and a member of the expedition. He said no skeletons previously have been found in this area, and added that the findings may be helpful in determining the nature of the early cultures here.

The first skeleton was found in a stone mound, 300 feet above the present level of the lake, which had a sandy core under the surface of the stones. The skeleton was found in the sandy core. While no tools were found with the skeleton, because the surface of the ground at the time of burial was a foot higher than it is at present there is little doubt of its antiquity.

Prof. Deraniyagala said stone implements are scattered abundantly around the area of the burials, and these may belong to a culture equivalent to the Neolithic of North Africa and Europe.

Stone flakes, which may have been contained in a skin bag long since rotted away, were found close to the second skeleton. This skeleton, found in a different locality, may be older than the first, judging from the stone tools, which may correspond to the mesolithic of Europe.

Science News Letter, June 12, 1948



GENETICS

"Bleeder's Disease" Can Occur in Puppies

➤ HEREDITARY bleeding, or hemophilia, can occur in dogs as well as in human beings. When it does occur it is sex-linked, that is, it is found only in males, as is also the case with human hemophilia. And, as in human beings, the luckless male offspring inherit the disease not from the father but from the mother.

The unhappy lives and early deaths of 17 hemophiliac puppies have been studied by three Cornell University scientists, Drs. F. B. Hutt, C. G. Rickard and R. A. Field. They all belonged to the same owner and had the same ancestry. None lived to be more than seven months old.

Fatal or crippling bleeding could be started by the slightest accidents: tumbling about in play, or being gently picked up by the owner. Such bruise-bleeding was usually internal, producing masses of blocked-up blood which in turn often caused disabling paralysis. One puppy, in cutting a tooth, started such a hemorrhage from its gums that it had to be killed.

A search of the records has disclosed only two previous cases of canine hemophilia; in those the puppies also died young. The only other species known to produce bleeder offspring, aside from man, has been the pig.

A detailed account by the Cornell scientists appears in the *Journal of Heredity* (Jan.).

Science News Letter, June 12, 1948

GENERAL SCIENCE

Aid Program Could Also Restore World Science

➤ ONLY one percent of the total investment suggested for this country's contribution to world economic recovery would restore science in foreign countries to prewar levels, a report of a committee of the National Research Council has estimated.

With approximately \$80,000,000 needed to replace war-lost scientific apparatus alone, the total needed to restore science abroad to its former level

was calculated at between 150 and 200 million dollars. The report was made by Dr. W. A. Wildhack, physicist at the National Bureau of Standards and chairman of the Research Council's Committee on Scientific Equipment.

"It is to be hoped that the officials charged with the formulation and administration of our program of foreign aid will see that an appropriate portion of funds and materials are made available specifically for this purpose," the report declared.

Pointing out that science is "uniquely international," the report said that "no other phase of reconstruction will more effectively lay the groundwork for a wider cooperation and understanding among peoples and nations."

Science News Letter, June 12, 1948

INVENTION

Patent Issued on Fender Straightener

➤ A MACHINE for straightening dented fenders without detaching them from the car has been patented by John M. Johnson and Bernard P. Leaf of Lindsborg, Kans. It is based on a strong I-beam that can be securely anchored to the frame of the car with a chain. At one end of the beam is a lever with a curved dent-removing tool at its free end. Force is applied to this lever by means of a hydraulic cylinder and piston, until the fender has been restored to its original shape.

U. S. patent 2,442,604 has been issued on this device.

Science News Letter, June 12, 1948

INVENTION

Radioactive Materials Incorporated in Glass

➤ FOR convenience of handling radium and other radioactive materials in research and industrial applications, Solomon Rosenblum of Princeton, N. J., incorporates it in glass. The radioactive material is laid on the surface of a glass plate, sandwiched between two metallic plates. An electric current simultaneously heats the glass (which increases its conductivity) and incorporates the material into its substance. After cooling, the glass is ready for use as a source of radiations and as an air ionizer.

Patent 2,442,617, granted on this invention, has been assigned to the Canadian Radium and Uranium Corporation.

Science News Letter, June 12, 1948

ELECTRONICS-ENGINEERING

Magnetization Measured From Small Metal Sample

➤ THE magnetic performance of a metal after becoming a part of finished electrical equipment can be determined accurately beforehand from a small sample of the material by means of a new device revealed by the General Electric Company.

Sensitive enough to record minute quality variations between samples of the same metal, the device tests thin-gage, magnetic metals for energy losses when subjected to magnetization, and also measures the ease with which the metal may be magnetized. It enables engineers to predict very closely the properties of magnetic materials in motors, generators, transformers and other equipment.

This electrical instrument, with dial-operated measuring devices, will be known technically as the "A-C Permeability and Core Loss Equipment." It can be operated by a relatively untrained person. A number, built in Schenectady, N. Y., are now in use in the steel and electrical industries.

Science News Letter, June 12, 1948

BIOCHEMISTRY

Blood Proteins To Be Kept In New, Special Museum

➤ RESEARCHERS on the proteins of the blood and other body tissues will presently be able to conduct studies in the comparative chemistry of these compounds from many different kinds of animals, at a new, special serological museum now being assembled at Rutgers University. It is an outgrowth of studies in systematic serology which have been conducted in the department of zoology during the past 23 years by Prof. Alan Boyden and his students.

The museum already has blood protein samples, from hundreds of species of animals, contributed by many other institutions. It is expected that more will be received in the near future.

The Rutgers museum is unique among places where zoology is studied. Typically, museums keep only the "innermost insides and the outermost outsides" of animals—that is, their skeletons and their skins, which are relatively easy to prepare and preserve. Here, at least the chemical compounds that keep their life-processes going will be preserved for comparative research.

Science News Letter, June 12, 1948

CHEMISTRY

Nylon Has Many New Uses

Tough, versatile plastic has been found to have wool-like qualities adaptable to rugs, socks and sweaters. Felt, velvet and upholstery fabrics can also be made of nylon.

By MARTHA G. MORROW

➤ **NYLON**, famous as the glamour thread that makes stockings more sheer than silk, is proving itself a tough plastic adapted to many new uses. Don't be surprised if you find:

Golf club heads with a nylon protective coating.

Gears and bearings of nylon in adding machines and electric shavers.

Wrist watches with straps made of it.

Nylon heads on soft impact hammers used in metal work.

Harps and guitars strung with nylon.

The fiber is proving its versatility by acquiring wool-like qualities. Thick, serviceable rugs are made of nylon, as are warm, quick-drying men's socks and soft, woolly sweaters. Felt, velvet and upholstery fabrics can be made entirely of nylon, or of nylon in combination with other fibers.

Nylon in Short Lengths

These new textiles are possible because nylon is being produced in short lengths. The continuous filament is given a permanent wave, then cut into lengths of a few inches so it can be handled like wool or cotton.

The name nylon is a generic term used to designate not one compound but a whole family of related compounds. These nylons are similar in chemical structure, but may be made in different degrees of toughness, hardness, flexibility and color. The formula used to produce dull nylon yarn, for example, is different from that used in making nylon for plastic cups and faucet washers.

A nylon molecule contains atoms of hydrogen, nitrogen, oxygen and carbon. One important type of nylon is made by the union of two chemical compounds with the involved names of hexamethylene diamine and adipic acid.

The diamine is made from coal (coke), air and water; from cyclohexane, a petroleum product; or from furfural, which comes from such farm by-products as corn cobs and oat hulls. Adipic acid is made either from coke, air and water, or from petroleum.

The Du Pont company neither makes stockings nor forms plastic articles. They manufacture nylon yarn for stockings and the material from which plastic fabricators make such things as nylon combs and gaskets. Each pair of stockings, for instance, contains only about 10 cents worth of nylon.

Nylon salt, the starting point for either hosiery or plastics, is dissolved in water to make it easier to ship. Upon reaching the spinning plant, the solution is heated to evaporate the water. When a certain concentration is reached, it is heated in an autoclave, a kind of giant pressure cooker. Here heat links the relatively small nylon salt molecules into giant ones.

This process, carefully controlled as to temperature and duration, gives nylon a molecular structure somewhat similar to wool and silk.

The hot, syrupy nylon is next allowed to flow out onto the broad rim of a large, slowly revolving wheel. Here a

shower of water cools and hardens the nylon. The white ribbon is dried and chopped into flakes.

If the nylon is to become yarn, the translucent flakes from various batches are blended and melted. The liquid nylon is pumped out through tiny holes in a spinneret, a metal disc about the size of a silver dollar and as thick. To insure a filament of even diameter, the molten nylon is made to flow uniformly. Through each of these holes comes thousands of feet of thread each minute.

Formula Varied Slightly

If the material is destined to be molded like a plastic, the ivory flakes are thoroughly dried and ground up into nylon molding powder compounds. The formula may be varied slightly, depending upon the finished article.

Nylon is a thermoplastic, so can be reheated and reshaped a number of times. It does not soften until the temperature goes much higher than that at which other thermoplastics soften—well above 300 degrees Fahrenheit.

The finished article, on the other hand, can hold its shape at relatively



HANKS OF NYLON—These will be used for bristles in tooth, hair and industrial brushes. They are inspected as they are tied up in preparation to being cut into bristle lengths.



NYLON FLAKES—This shows them being fed into the hopper of a spinning machine where the flakes are melted and extruded into filaments.

high temperatures. Drinking glasses and nursing bottle funnels of nylon can be sterilized by steam without harm.

Melted nylon flows about as readily as light lubricating oil. Being so fluid, the plastic can be molded satisfactorily into articles of complicated shape and delicate structure. Nylon insulated wire played an important part during the war in keeping communications open on battle fields.

Sheets of the plastic, useful in machining a small number of pieces, can be made either by squirting out liquid nylon in sheet form or by slicing pieces of the required thickness from a nylon block. Strips of this sheet, like the yarn, can be stretched to several times their original length. Rods of various diameters permit samples for new applications to be machined and tested prior to the purchase of expensive molding equipment.

Bristles for brushes are made from thick strands of nylon. For hairbrushes and toothbrushes, the nylon bristle is of uniform diameter. A large number of long strands, tied together, are cut simultaneously into short lengths. Bundles of these are later fed into automatic machines that give tooth and hair brushes their bristles.

Bristles for paint brushes are more difficult to make. They must be tapered so the brush will flex properly and spread the paint well. Molten strands of

nylon, coming from a spinneret with fairly large holes, are pulled away at a carefully controlled varying rate. By pulling now faster, now slower, the diameter of the strand is alternately decreased and increased.

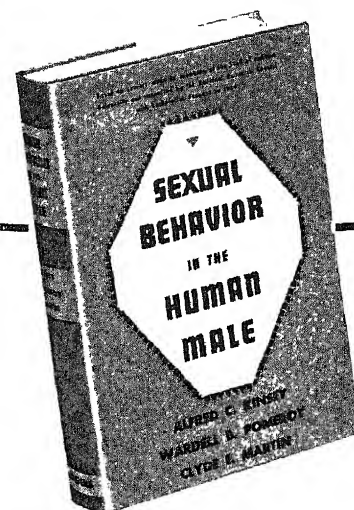
Nylon textiles being made today in continuous forms include both the single or monofilament strand and a number of strands twisted together, called multifilament.

Multifilament Yarns

Multifilament yarns are made in both standard and high strength. They range in size from 20 to 210 denier (450 meters of one-denier yarn by definition weighs five centigrams). Single filament yarns are made in 15 denier and, for super-sheer stockings, have been produced experimentally as fine as 10 denier.

Only within the last year has nylon become available in cut-to-length, staple form. After being drawn to several times their original length to orient the molecular structure and increase the strength and elasticity, the strands are crimped by moist heat and pressure, and cut into short pieces, called staple. Thus nylon can be used in combination with other short fibers. When used alone, in the form of staple, it produces a thick, wool-like fabric.

Filament deniers of nylon staple range from $1\frac{1}{2}$ to 15. A 15-denier yarn is about three times as fine as a human hair



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Do You Know?

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One type of *seismograph*, an instrument used to detect and record earthquake vibrations, magnifies ground motion 100,000 times; weak quakes thousands of miles away are picked up by it.

Following the two great earthquakes in 1906, in California and Colombia, a world-wide interest resulted which is responsible for the establishment of many new seismograph stations to receive and record earth motions.

There are four basic *odors* classified by scientists as fragrance, acid, burnt and caprylic; caprylic comes from a Latin word meaning goat and applies to all animal odors with the best known example perhaps that of a wet dog.



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Stockings and socks regain their original shape when washed because they have been permanently "set" with steam or very hot water. Once given a desired shape or form, they hold this shape permanently.

Nylon was first introduced to the public about 10 years ago. Twenty years ago the late Dr. W. E. Carothers, its discoverer, little dreamed that his research would lead to a material versatile enough to be used both as a plastic and as a synthetic textile fiber.

Nylon made its first public appearance

as a toothbrush bristle. It established its popularity as yarn for sheer, quick-drying stockings. During the war it was so much in demand for military use that for more than three years no nylon was available commercially, except possibly in toothbrush bristles.

Today nylon is used in tire cord and laundry nets, garden hose and work gloves, sailcloths and trolley cords. It is beginning to appear in self-locking nuts and hypodermic needles, in phonograph needles and lawn sprinklers. Still an experimental product, nylon's usefulness is just beginning to be explored.

Science News Letter, June 12, 1948

ENTOMOLOGY

Test DDT in Wind Tunnel

➤ MOSQUITOES in a wind tunnel are the newest means for testing the effectiveness of DDT in aerosols or fogs, such as are used for the large-scale "de-pesting" of summer resorts, athletic stadiums and the like.

The work is being done as a joint research project at the Beltsville, Md., experiment station of the U. S. Department of Agriculture, near Washington. First results are reported in the *Journal of the Washington Academy of Sciences* (Nov. 15, 1947).

The wind tunnel is small, as compared with those used in aviation research: only a foot square in cross section and 32 feet long. About midway of its length a wire cage containing the victim mosquitoes can be inserted. Air speeds are low, simulating normal out-of-door conditions: they ranged from two to 16 miles an hour in the present experiments.

DDT fog was released by a standard method, to give particles of controlled diameters, from one to twenty microns—that is, from droplets about the size of the smallest known bacteria up to specks just barely visible to the naked eye. Mosquitoes in batches were bombarded with particles of all sizes, at the four velocities used. Results were measured in terms of percentages of dead mosquitoes.

In general, it was found that better kills were obtained with the larger DDT-fog particles, and that higher air velocities were more effective than lower ones. It was even possible to plot the results as ballistic curves. The experiments are still being carried on.

Earliest results, just reported, were obtained in a joint research program shared by the U. S. Bureau of Entomol-

ogy and Plant Quarantine and the Central Aerosol Laboratory of Columbia University, supported by OSRD and NDRC funds. Workers were Drs. Randall Latta, Lauren D. Anderson, E. E. Rogers, V. K. LaMer, S. Hochberg, H. Lauterbach and I. Johnson.

Science News Letter, June 12, 1948

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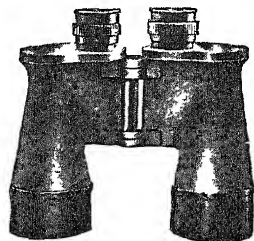
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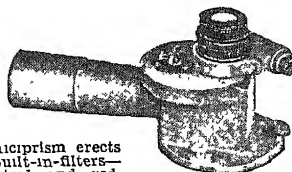
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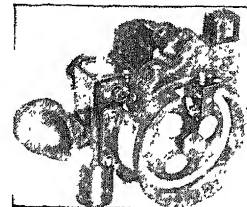
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Food from Trees

➤ PRACTICALLY all of our staple food crops are either annuals, biennials or perennials with a very brief life cycle. All of our grains start and finish their lives in the same growing season, with the exception of small-grain crops sown in the fall, which are thus semi-biennials. Potatoes, both white and sweet, are potentially perennials, but for cropping purposes we treat them as annuals. Carrots, parsnips and similar root vegetables are biennials, but good for food only during their first season.

All this means that the greater part of our food-producing areas are kept in a state of constant instability. To be planted every year, the soil has to be plowed and otherwise disturbed every year. The degree to which erosion is wasting our plowlands has everyone alarmed.

A large part of the cultivated land in the world was originally forested, and

much of it should be growing trees now, but for the necessity of providing larger quantities of food per acre than trees will produce. Food-bearing trees produce mainly fruits and nuts, which are commonly used as food accessories rather than as main courses. Three outstanding exceptions are the olive, which is a dietary mainstay in Mediterranean lands; the date, which is the bread of the desert; and the coconut, which makes life possible in many tropic lands which would otherwise be unpopulated.

What we really need, for our erosion-menaced temperate-zone lands, are some highly productive tree crops of this kind. What they might be is hard now to imagine, so thoroughly tied to the one-year cropping method have we become. The sparser populations of forested

lands where life is still lived at a pre-agricultural level do depend to some extent on tree foods—acorns, pinon nuts and the like, often shelled and ground into meal for boiling or baking.

There is a serious drawback to dependence on tree crops for one's principal food supply. Many trees produce only one good crop in two or more years; primitive peoples depending on them alternate between feast and famine. However, if we could find a tree that would supply us with the equivalent of bread or potatoes, we might now be able to overcome this irregularity by intensive application of fertilizer around the roots, or spraying with growth-control chemicals. The main problem still is to find the right tree.

Science News Letter, June 12, 1948

ZOOLOGY

Rats Are Poor Emigrants

If forcibly introduced into another rat community, they either tried to return to their old haunts or died off. Strangers fared worse than "natives" in death rate.

➤ RATS, despite their seeming boldness, do not make very successful emigrants. They are stay-at-home conservatives, and if they are forcibly introduced into an already established rat community they do not fare too well. Experiments in rodent sociology leading to these conclusions were reported in the *Journal of Wildlife Management* (April) by Dr. John B. Calhoun of the Johns Hopkins University, Baltimore.

A considerable number of rats, marked for subsequent identification, were released in the yards of city blocks where they were "aliens." Previous studies had already established the fact that a city block is a natural "country" for its rat inhabitants, with streets and clear alleys as recognized frontiers. These "alien" rats began to migrate at once, and subsequent trappings and pick-ups of dead animals traced their movements.

When the "aliens" came from an adjoining block, fully half of the forcibly removed rats found their way home again. Even when they came from farther away, many of them would leave the strange new neighborhood. On the other hand, the "native" rats stuck to their home territory, despite disturbances in the population balance caused by the arrival of the strangers.

Death rates among native and alien

rats went up when the rat population was thus artificially increased. But here again the strangers had the worst of it, for their death rate was three times that of the natives.

When the rat population of a city block is reduced by poisoning or trapping, it comes back to its original level at a fairly even rate, other studies reveal. If the kill is between 50% and 90%, the comeback rate is about four percent a month. If the kill is much lighter or much heavier, the comeback rate is slower.

The study was made by Drs. John T. Emlen, Jr., Allen W. Stokes and Charles P. Winsor, of the Johns Hopkins School of Hygiene and Public Health. They made careful counts of the visible rat populations in 34 densely-built city blocks, with the cooperation of the residents. Then they decimated the populations with ANTU, and continued their close survey as the rats bred up towards the original levels.

In general, they found, the rat population of a given block will remain indefinitely at a given level, and that after partial destruction will in time re-establish itself at that level.

A detailed report of the three-man team's results is published in *Ecology* (April).

Science News Letter, June 12, 1948

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ABOUT THE KINSEY REPORT: Observations by 11 Experts on "Sexual Behavior in the Human Male"—Donald Porter Geddes and Enid Curie, Eds.—*New American Library*, 166 p., paper, 25 cents. Comments by representatives of various fields of the social sciences.

ASTM MANUAL OF ENGINE TEST METHODS FOR RATING FUELS—*American Society for Testing Materials*, 320 p., illus., \$8.00

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THE EARTH AND ITS RESOURCES: A Textbook for Courses in Physical Geography and Earth Science—Vernor C. Finch, Glenn T. Trewartha and M. H. Shearer—*McGraw-Hill*, 2d ed., 584 p., illus., \$3.20. Basic to an understanding of the problems of conservation is a knowledge of natural resources. A high-school text.

THE ELECTRON MICROSCOPE. Its Development, Present Performance and Future Possibilities—D. Gabor—*Chemical Publishing Co.*, 164 p., illus., \$4.75. A book by a British author intended for the guidance of those who use this microscope. Includes a note on the proton microscope.

HEMORRHAGE—Gregory Schwartzman and others—*New York Academy of Sciences*, 178 p., illus., paper, \$3.00. A series of papers resulting from a conference on hemorrhage.

HYDRAULIC RESEARCH IN THE UNITED STATES—Florence L. Bain, Ed.—*National Bureau of Standards*, 199 p., paper, may be obtained without charge by hydraulic laboratories, libraries, accredited hydraulic engineers by requesting direct from the Chief, National Hydraulic Laboratory, National Bureau of Standards, Washington 25, D. C.

INTRODUCTION TO MEDICAL PSYCHOLOGY—L. Erwin Wexberg—*Grune & Stratton*, 171 p., \$3.50. Intended, not for psychologists, but for the general physician who needs to understand his patients.

MEDICAL RESEARCH IN WAR—Medical Research Council (British)—*British Information Services*, 455 p., paper, \$2.35 (approx.). Reporting a wide variety of researches in civilian as well as military medicine and nutrition.

RADAR: What Radar Is and How It Works—Orrin E. Dunlap, Jr.—*Harper*, rev. ed., 268 p., illus., \$3.00. A popularly written account by a vice-president of RCA.

TEXTBOOK OF CHEMISTRY—Albert L. Elder, Ewing C. Scott and Frank A. Kanda—*Harper*, rev. ed., 758 p., illus., \$4.50. Intended for those students who intend to become scientists.

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Science News Letter, June 12, 1948

PHYSICS

New Clue to Cosmic Rays May Solve Many Mysteries

► DISCOVERY that primary cosmic rays consist of less than four percent electrons may be an important new clue toward solving several of the mysteries of these powerful rays which bombard the earth from outer space.

Massachusetts Institute of Technology scientists reported the discovery in experiments which included ray-counting flights in a B-29 airplane.

Major component of cosmic radiation is now believed to be protons, the hearts of hydrogen atoms.

The new findings may help explain not only the composition of cosmic rays but also where they come from.

Dr. Bruno Rossi and Robert I. Hulsizer, Jr., conducted the research which was supported in part by the Office of Naval Research.

Science News Letter, June 12, 1948

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⚙️ **ROLLING-PIN** is made of an aluminum tube with one end removable so that ice may be packed within for the cold-rolling of dough. This device may be used also for a cocktail shaker.

Science News Letter, June 12, 1948

⚙️ **ELECTRIC-LOUPE**, equipped with a comfortable, plastic-covered head band and a light-weight, flexible cord running into the transformer, is designed for watchmakers, toolmakers, engravers and others who need clear, cool light on their work. It plugs into any 110-volt outlet, reducing the current to 7.5 volts.

Science News Letter, June 12, 1948

⚙️ **HOME HEATING** equipment utilizes natural gas during mild weather and fuel oil in severely cold weather, an outside thermostat switching automatically from one fuel to the other at a pre-determined temperature. A single unit burns both fuels, the oil being vaporized in a shallow pan where it is heated by a small gas burner.

Science News Letter, June 12, 1948

⚙️ **MINIATURE MICROPHONE**, about the size of a package of cigarettes and small enough not to hide the face of a speaker at a public meeting, is made possible by designing the magnetic structure as a part of the case. It is claimed to have the sensitivity of the finest broadcasting microphones now in use.

Science News Letter, June 12, 1948

⚙️ **BARRETTE**, shown in the picture, is made of flexible plastic in an ingenious one-piece design based on the simple under-and-over, figure-eight principle.



It is a self-locking device that does away with the conventional hook-type, and its contour shape permits it to lie close to the head.

Science News Letter, June 12, 1948

⚙️ **SEARCHLIGHT** for Coast Guard cutters, a remote-control device with 32,000,000 candlepower, uses a 900-watt mercury lamp no longer than a kitchen match. Control panels, each with hand-wheels for traversing or elevating the searchlight, are placed at various points on the vessel, and can be operated by one man.

Science News Letter, June 12, 1948

⚙️ **CONFIDENTIAL RECORDING** system consists of a plastic tracking disk which, when used with a machine that magnetically records on thin paper or

plastic records, produces a voice unintelligible to anyone who plays it back unless he has an identical tracking disk of the same code. Each purchaser has a set of identical disks and no others are made exactly the same.

Science News Letter, June 12, 1948

⚙️ **BACKING MATERIAL** for floor rugs comes as a white liquid rubber but dries in an hour to form a tough, transparent film which prevents rugs from slipping when walked on. Treated rugs are still washable, and the material does not come off on the floor. It will be available in pint containers for home use.

Science News Letter, June 12, 1948

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Question Box

AGRICULTURE

What untapped sources of edible oil have been found? p. 374.

ENTOMOLOGY

What results were obtained after testing DDT in a wind tunnel? p. 380.

MEDICINE-ZOOLOGY

What advantages do shrews have for medical research? p. 378.

What results have been obtained with KR, the anti-cancer serum? p. 371.

ORNITHOLOGY

What is the latest evidence regarding guides to bird migration? p. 373.

ZOOLOGY

What have experiments revealed about rat sociology? p. 382.

Photographs: Cover, p. 373, Fremont Davis; p. 371, The Warner & Swasey Co.; p. 374, FAO; Dr. Dale Jenkins; p. 375, Westinghouse Electric Corp.; p. 378, p. 379, Du Pont Co.



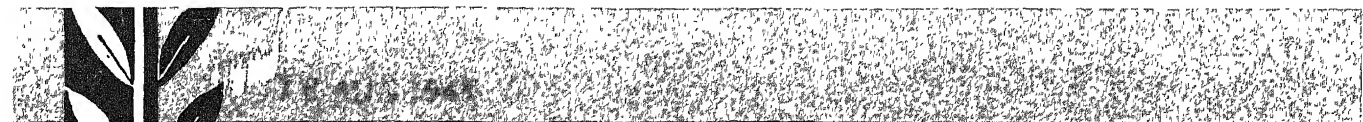
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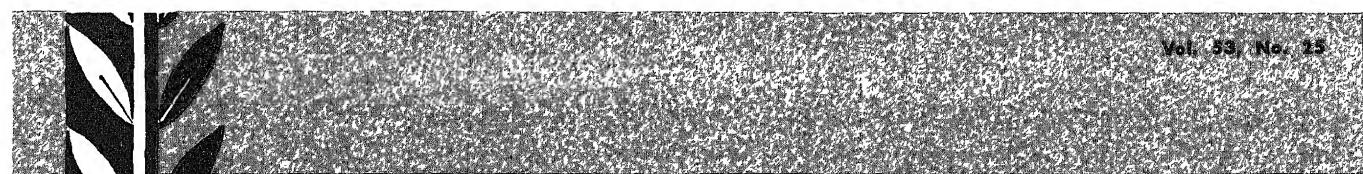
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SCIENCE NEWS LETTER



Vol. 53, No. 25

THE WEEKLY SUMMARY OF CURRENT SCIENCE • JUNE 19, 1948



New Comet

See Page 389

A SCIENCE SERVICE PUBLICATION

MEDICINE

Plastic Balls for TB

Patients undergo fewer operations and have less deformity when these ping pong balls are placed in their chest. Only a piece of one rib needs removing.

► **LITTLE PING PONG**, or table tennis, balls made of acrylic plastic are helping some tuberculosis patients back to health, Dr. Allan Hurst, medical director of the National Jewish Hospital, Denver, reported at the meeting of the National Tuberculosis Association, in New York.

The patient does not play games with the balls. They are put into his chest, sometimes as many as 100 of them. There they stay, holding his diseased lung collapsed and at the same time preventing a cave-in deformity of the chest.

Up to April 15, 1948, 50 operations using these lucite spheres have been performed at the National Jewish Hospital. In 14 months experience with the operation, no complications have been noticed.

The plastic ball operation is used in some cases instead of the standard procedure of removing the ribs over the diseased part of the lung and letting the

soft rib covering fall in and collapse the lung. With the plastic balls, only a piece of one rib need be removed. The advantages are fewer operations per patient, appreciably less deformity, maintenance of lung function, better collapse where it is desired, less shock, and earlier getting out of bed for the patient.

One possible future disadvantage is that certain vital organs may become eroded because lucite is so rigid. With this possibility in mind, other plastic substances are now being investigated as substitutes.

Enthusiasm for this surgery must be restrained, Dr. Hurst warned, until further knowledge is gained with more experience. Care must be taken in selecting patients for the operation, in order to avoid complications after the operation.

Science News Letter, June 19, 1948

MEDICINE

Betatron Fights Cancer

High energy x-rays of 20,000,00 volts will be produced by the machine for treatment of patients with deep-seated cancer. Will start some time next year.

► **PATIENTS** with deep-seated cancer of internal organs will be getting treatment with 20 times more powerful X-rays starting some time next year (1949).

The high energy X-rays, 20,000,000 volt instead of 200,000 to 2,000,000 volt, will come from the new betatron to be installed at the University of Illinois College of Medicine in Chicago. It is the world's first installation of a betatron for cancer treatment and research, university officials said.

Advantage of the betatron-produced X-rays for cancer treatment is that they can be concentrated at their maximum intensity on organs deep within the body, such as the stomach and liver. Danger of surface damage, at points where the X-ray beam enters and leaves the body, will be less than with lower energy X-rays. These have their greatest effect

at point of entry into the body which limits their value in treating deep-seated cancers.

The X-rays from the betatron are produced by bombardment of a platinum target with high energy electrons. The high energy electrons themselves have great possibilities for cancer treatment. They offer the possibility of even greater concentration of effect at a point inside the body and of completely using up their energy at that point so none go on to an exit.

The betatron was invented by Prof. Donald W. Kerst of the university's physics department at Urbana-Champaign. He immediately pointed out its cancer-fighting possibilities but research in this direction was delayed during the war.

A push-button controlled instrument

producing a 20-million volt X-rays was developed by University scientists and the Allis-Chalmers manufacturing company of Milwaukee.

One of these will be installed at the college of medicine. Delivery is expected in approximately five months. Dr. Roger A. Harvey, head of the college's department of radiology, will be in charge. Because of tests and developmental work necessary with this entirely new type of cancer weapon, it is unlikely that any patients will be treated until some time in 1949.

Science News Letter, June 19, 1948

MEDICINE

Plant-Fruit Extract Aids Heart Disease Patients

► **A "POWERFUL DRUG"** for treating heart disease was announced at the meeting of the Interamerican Cardiological Congress, in Chicago.

"Distinct improvement" in 140 of 250 patients and "moderate improvement" in another 85 patients given daily doses of the drug were reported by Dr. M. R. Kenawy of Cairo, Egypt. Only 25 of the group showed no benefit.

The drug is called khellin. It is extracted from the fruit of a plant growing in the Middle East. The fruit is called Amni visnaga.

Khellin is a powerful dilator of the blood vessels of the heart. Constriction of these blood vessels, with decreased blood supply to the heart muscle, is the trouble in some kinds of heart disease. Khellin's dilating action is very prolonged, lasting for many hours. It is apparently nonpoisonous.

Because of its antispasmodic action, khellin also has been found suitable in treatment of bronchial asthma.

For clearing the swelling, or dropsy, in advanced heart failure, lots of water, some acid and a moderate reduction in salt are needed, Dr. F. R. Schemm of Great Falls, Mont., declared.

This treatment scheme succeeded in four-fifths of 322 instances. But in 160 other instances, the swelling was not cleared when only two of the three measures were used. No two succeeded alone, even when salt was completely removed from the diet, or as much as eight quarts of water was given daily, or when heavy doses of acids were given with one or the other measure. But much less drastic salt restrictions, acid doses and water drinking when used together produced "dramatically" good results.

Science News Letter, June 19, 1948

AERONAUTICS

Attempt Supersonic Speed

Several planes are under construction to beat the transonic record of the XS-1. They are designed for transonic speeds and to beat the speed of sound.

➤ SEVERAL planes, either completed or under construction, are scheduled to attempt soon to beat the transonic record of the XS-1 which, according to official announcement, travelled faster than the speed of sound in a number of test flights last October at Muroc Field, Calif.

Among these are the XS-2, under construction by Bell Aircraft with the advice of the National Advisory Committee for Aeronautics, in which are being incorporated lessons learned from the XS-1 flights during the past year. There is also the Douglas-Navy Skyrocket, an improved sister ship of the Douglas Skystreak which made the world's official speed record. Also the British have a plane about ready for a final test. Then there is a Russian plane rumored to have already beat the speed of sound.

For security reasons, details of the new XS-2 are not announced. It is to be rocket-powered like the XS-1, but is understood to be less chubby in body

and to have thin swept-back wings rather than the straight thin wings of its predecessor. It is these thin wings, inclined backward like those of a bird in flight, together with a slender body and long, sharply pointed nose, that are included in the Skyrocket to permit it to achieve transonic speeds.

The actual speed of the XS-1 when it travelled faster than sound is not revealed. Sound at sea level travels at about 760 miles an hour. At high altitudes it is less. Seven miles above the earth it is about 660 miles an hour. However, the so-called sonic barrier at any altitude depends upon the speed of sound in that region. The speed of sound depends upon the elastic limits of the air. These vary with temperature changes. In theory at least, a transonic plane could reach a higher actual speed when traveling close to the earth on a hot summer day than it could in the cold upper atmosphere.

This transonic barrier is due to the

formation of pressure waves on the wings of a plane when it approaches the speed of sound. They are the so-called shock waves that grip the plane and tend to hold it back. Their existence is not a theory. They can be actually seen in what are known as schlieren photographs, taken of the air passage over wing models in wind tunnels. These are made by passing parallel rays of light through the tunnel to focus in a camera. The air in the shock waves is denser than elsewhere; consequently the rays passing through are bent, and either a light or a dark place appears on the photograph.

Transonic speeds are important in military activities where great speeds are essential. In civilian flying, however, they are of less interest at the present time principally because present transports are not designed for these excessive speeds, and speeds can be achieved only at a great expenditure for fuel.

Science News Letter, June 19, 1948

NUCLEAR PHYSICS

Historic Cyclotron Begins Operation at New Site

➤ THE historic atom smasher with which Dr. Ernest O. Lawrence of the University of California first cracked the atom 14 years ago began operation early this month at a new site at the University of California at Los Angeles.

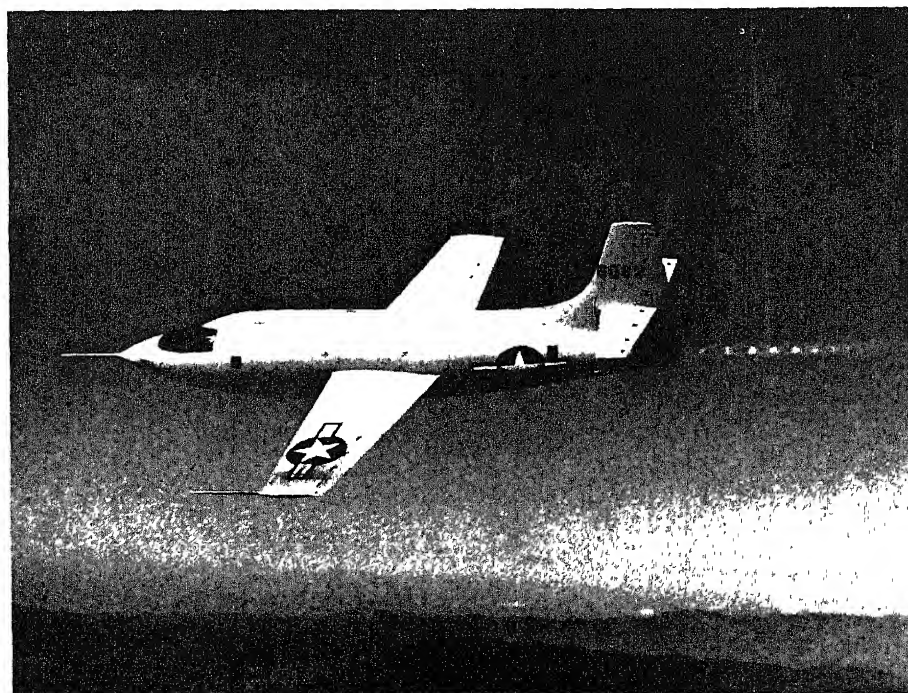
The 37-inch cyclotron which was used in making many important discoveries at Berkeley now makes Los Angeles only the second city on the Pacific Coast to boast an atom smasher.

The 37-inch machine was used in the first successful demonstration of the electro-magnetic separation of the potent uranium 235 from common uranium, an important step in the manufacture of the atom bomb.

Application of electrical frequency modulation control to a cyclotron, a process which doubled the tremendous power of the instrument, was also first adapted to this machine, making it the first synchro-cyclotron in history.

Designed originally to generate energies of 7,000,000 electron volts, the 37-inch cyclotron now accelerates atomic particles to energies of 15,000,000 electron volts.

Intensive research on the nature of the forces which hold matter together—one of the great unsolved problems confronting modern science, the production of radioactive isotopes for medical research and for experiments in nuclear



ROCKET-POWERED XS-1—In a number of test flights, this plane flew faster than the speed of sound, according to information just revealed. Several planes are scheduled to attempt to beat this record.

chemistry are projects planned for this cyclotron.

After a gigantic moving job during which the 80-ton machine was transferred to Los Angeles from the Berkeley campus, the cyclotron was completely overhauled and refurbished under the direction of two well-known young nuclear physicists who cut their scientific

GENERAL SCIENCE

Questionnaire Censorship

➤ THE civilian Research and Development Board and the Departments of the Army and the Navy were accused of attempting "to prevent scientists from finding out just where they stand on security matters."

The charge was made in a report by the Committee on Secrecy and Clearance of the Federation of American Scientists in Washington. Members of the committee are all Cornell University scientists.

They sent a questionnaire to 140 laboratories last fall seeking information on loyalty clearance of scientists. Forty percent of the laboratories, including the atomic bomb laboratory at Los Alamos, N. Mex., answered the questions. But some officers of the Navy and the Army and an official of the Research and Development Board tried to obstruct the investigation, the committee declared in its report published in the *Bulletin of the Atomic Scientists* in Chicago.

A memorandum from F. H. Richardson, deputy executive secretary of the Research and Development Board headed by Dr. Vannevar Bush, to expert consultants of the Board was termed "intolerable" by the Federation committee.

The memorandum reprinted in the report does not mention the committee's questionnaire specifically. It calls attention to questionnaires concerning clearance procedures and requests that they be sent to the Board before they are answered.

A portion of the Board memorandum declares:

"There are in existence today a large number of organizations whose objective is to gather such information and later use it as material for propaganda and 'smear' programs in an attempt to discredit the U. S. form of government."

Commenting on the memorandum, the Federation of American Scientists report contended that "It operates wholly by innuendo, naming no names, citing no questions."

teeth on this instrument and who accompanied it on the long haul from Berkeley. It is housed in a new \$75,000 temporary building constructed especially for this purpose on the Los Angeles campus.

In charge of the work is Dr. J. Reginald Richardson, associate professor of physics at U. C. L. A.

Science News Letter, June 19, 1948

The Research and Development Board, the committee found, "has apparently at least some policy-making employees more military than the military."

Both Army and Navy officials were reported to have warned laboratories against answering the committee's questionnaire.

An inquiry by the committee to the office of Rear Adm. Thomas B. Inglis, Chief of Naval Intelligence, asked which of the questions on the questionnaire were classified.

"I regret to inform you that I am unable to supply you with the information requested," the report quotes Adm. Inglis as answering.

"We have told the story of the response to our questionnaire as a sign of 'the Prussian disease,'" the committee of scientists concluded.

The report explains that the term "Prussian disease", which has been used by Dr. Albert Einstein, includes "gradual encroachment upon the rights of scientists as citizens, and upon their freedom as scholars, the suppression of criticism, and the establishment of the official one-track mind . . ."

This report was the second made by the Federation's Committee on Secrecy and Clearance, which several weeks ago criticized loyalty clearance procedures. Members of the committee include a leading atomic scientist, Dr. Hans A. Bethe, and a Nobel prize winner, Dr. P. J. W. Debye, chairman of the department of chemistry at Cornell. Dr. S. H. Bauer is chairman of the group which includes Drs. L. M. Brown, G. K. Fraenkel, A. R. Moore, Philip Morrison, R. S. Rochlin and R. R. Wilson.

Science News Letter, June 19, 1948

Products made with lard, such as potato chips, pastries and crackers, are kept in good condition much longer by use of a new antioxidant; the same preparation also greatly increases the keeping time of lard itself.

ORNITHOLOGY

Gulls Shown as Robbers Of Other Birds' Nests

➤ GULLS as birds of prey, taking eggs from the nests of other birds and killing their young, as well as field mice, ground squirrels and other small mammals, make an unusual picture of these white-winged water-fowl presented in *The Condor* (May-June) by Dr. Arthur C. Twomey of the Carnegie Museum, Pittsburgh.

Presence of other birds' eggs in the nests of California gulls has puzzled other observers; but Dr. Twomey states that they are stolen and carried off for food. Sometimes the gulls carry them in

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their beaks, but more often they swallow them whole and later regurgitate them. They may let them lie around in the nest for a while, but after their own young are hatched the alien eggs are broken open and eaten.

California gulls range far inland; Dr. Twomey has observed their habits in Idaho, where he saw them attack and kill the young of wild geese, carrying

them off to feed to their own nestlings. Gophers, ground squirrels and other small animals met the same fate.

Dr. Twomey cautions against regarding California gulls as "vermin" and subjecting them to persecution because of these predatory habits. They destroy immense numbers of destructive insects, he points out, and have long been known as voracious devourers of mice.

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NUCLEAR PHYSICS

New Powerful Accelerator

Expected to be largest and most powerful laboratory research tool of its type in the world. Will take two years to complete and cost \$2,000,000.

➤ THE most powerful electrostatic accelerator known in the world will be constructed beside a cliff on a mesa in New Mexico at the Los Alamos Scientific Laboratory of the University of California, the U. S. Atomic Energy Commission has announced.

This new Van de Graaff-type generator will yield positive ions with energies up to 12,000,000 electron volts. The energy will be far less than the billion-electron-volt level proposed for new cyclotron-type "atom smashers," but the electrostatic generator has many advantages for certain types of atomic research.

Flexible, high precision energy control to one-tenth of one percent will be possible with the new machine. Scientists can change from one type of ion to another with continuously variable energies from 2,000,000 to 12,000,000 electron volts. Neutron beams between 30,000 and 30,000,000 electron volts will also be available.

Using the new accelerator, it will be possible to study the properties of both light and complex nuclei below 20,000,000 electron volts. Precise data are needed in this range which cannot be obtained

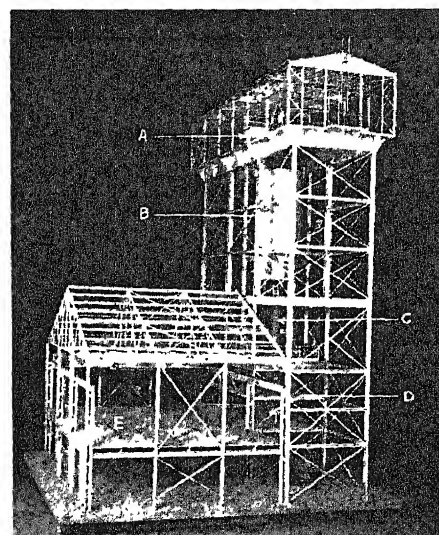
with other atom smashers.

The Van de Graaff generator is named for Dr. R. J. Van de Graaff of the Massachusetts Institute of Technology, the scientist who first used a belt to convey charge to high electrostatic potentials. The new machine planned for Los Alamos will be a pressurized Van de Graaff on which pioneering work was done by Prof. R. G. Herb of the University of Wisconsin.

The cliff-side structure will be 120 feet high with a control room and laboratory space housed on the top of the mesa. The generator will be 13.5 feet in diameter and 39 feet high. Total cost of the new generator and buildings will be \$2,000,000 and two years will be required for completion.

The electric charge is carried from the bottom to the top by a cotton belt 30 inches wide. By spraying the belt with a charge at the base, a great potential difference can be built up between the upper electrode and the ground. This potential difference is used to accelerate charged particles down two evacuated tubes in the column.

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ACCELERATOR MODEL—Important parts of the proposed 12,000,000 electron volt electrostatic accelerator are: (a) heavy crane (b) pressure shell enclosing generator (c) inner insulating column enclosing accelerating tubes (d) 90 degree reflecting magnet and (e) target rooms.

of his discovery being forwarded by Dr. L. Volta, director of the Royal University Observatory, Turin, Italy. Astronomers in this country were notified of the comet's discovery and position by Harvard Observatory, clearing house for such information in the western hemisphere.

Prof. J. J. Nassau, director of the Warner and Swasey Observatory, the Case Institute of Technology, at East Cleveland, took the picture on the cover of this week's SCIENCE NEWS LETTER with the 24-36 inch Schmidt-type telescope-camera at the observatory on June 6 at 4:15 a.m., EDT. Exposure time was four minutes. It shows the comet's tail extending for 2.5 degrees across the heavens. The comet was moving rapidly northwest.

Star-lovers watched the comet as it moved across the heavens, going from the constellation of Perseus into the constellation of Andromeda and on into Perseus again. At first visible just before dawn, as it moved away from the sun the comet could be seen in the early morning hours.

Comet Honda-Bernasconi soon began to fade in brightness, having dropped to fifth magnitude within a week of its discovery.

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ASTRONOMY

Spot Bright New Comet

See Front Cover

➤ A BRIGHT new comet flashed across the heavens early this month. Of the fourth magnitude when first seen, it was easily picked up with binoculars, and could also be spotted with the naked eye by people far from city lights.

The comet was discovered by watchful

observers both in Japan and Italy. Minoru Honda of Japan's Kurashiki Observatory spotted it on June 2. This is the second comet Mr. Honda has discovered within one year, as he spotted a ninth magnitude one last November.

The comet was independently found on June 4 by Giovanni Bernasconi, word

ASTRONOMY

Planetarium for Home Use

➤ STARS are now being brought into the classroom and home so that people can more easily learn to identify the constellations and brightest stars. A portable instrument for projecting the heavenly bodies and an inexpensive dome make this practical.

One type of dome can be built for as little as \$25. Designed by astronomers at Pennsylvania State College, it is to be used in connection with the planetarium developed by Dr. Armand N. Spitz, lecturer at Fels Planetarium and educational director of the Franklin Institute, Philadelphia.

The Spitz planetarium produces results strikingly similar to those used in large planetariums. A compact unit only three feet high, it weighs about 25 pounds. A light in the center of a 12-sided plastic box shines through holes punched in the vinylite sides to represent stars. The instrument currently sells for \$720.

The planetarium for home use projects on any surface the images of most of the stars usually seen with the naked eye. Constellations are immediately recognizable and the stars may be reproduced as seen from any location on the earth.

But when the planetarium is used in a room of conventional shape, the heavens as flashed near the corners of the room are distorted. Several inexpensive or quickly-assembled domes have been devised to avoid this difficulty.

In one model, plywood ribs are covered with a parachute. This cloth makes an ideal surface for projecting the stars. Another uses molded plywood that, unassembled, can be carried on top of a station wagon. It may be set up in a few minutes.

The \$25 dome built at Penn State has a framework of plywood. The paper surface upon which the stars are projected is cemented or fastened to the ribs with tacks.

In addition to short bolts and rubber cement or thumb tacks the following are needed:

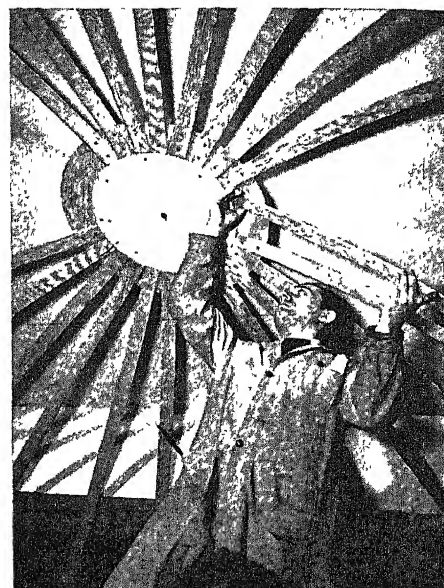
Three pieces of quarter-inch plywood, 8 by 12 feet.

110 sheets of 24 by 38 inch blotting paper.

Strips of plywood about two inches wide, cut from the large pieces, are arched to the center, forming the ribs for the dome. They are bolted to a circular disk of plywood that forms the dome's top. Other strips of plywood, placed on the framework several feet from the floor form the bottom of the planetarium dome. Blotting paper, cemented to the plywood ribs, forms the surface on which the stars are projected. The portable planetarium is installed on a low table within the dome.

"A ten-foot dome of this construction can be knocked down in about an hour, reassembled in less than three hours," says Dr. Henry L. Yeagley, associate professor of physics at Penn State.

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DOME FOR SKY STUDY—Plywood ribs for the Penn State Dome are bolted to a circular piece of plywood as spokes are bolted to the hub of a wheel.

developed the disease and died.

Now a search is on to find the right insecticide and spraying methods to protect street, lawn and park elms against this new-found enemy.

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GENERAL SCIENCE

UNESCO Plans Program For Occupied Germany

➤ A FOUR-POINT program to extend the work of the United Nations Educational, Scientific and Cultural Organization to occupied Germany has been announced by UNESCO headquarters in Paris.

The program adopted by a subcommittee includes:

1. Distribution of UNESCO publications, documents and other materials in Germany.
2. Facilitating the exchange of publications between Germany and other countries.
3. Studying the question of textbooks for Germany.
4. Surveying the opportunities and problems of exchanges of persons between Germany and other countries.

UNESCO's program in Germany will be carried on in cooperation with Allied occupation authorities. A similar program is being planned for Japan.

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FORESTRY

Insect Spreads Elm-Killer

➤ A small insect of the rather numerous group known as the leaf-hoppers has been convicted of carrying the virus of a disease that kills many elms in Mid-western and Southern states, by research workers of the U. S. Department of Agriculture.

The western elm-killing disease, called phloem necrosis, is quite different from the better-publicized tree malady commonly but incorrectly called the Dutch elm disease, which is known at present only east of Ohio. Phloem necrosis has been found from Ohio and parts of West Virginia west to Nebraska and Oklahoma, and south to Mississippi. The causal organism of the Dutch elm

disease is a fungus carried by a beetle; phloem necrosis is caused by a microscopically invisible virus which is carried, it is now demonstrated, by a leaf-hopper.

The particular species pronounced guilty by the entomologists is so small and inconspicuous that it never has had a common English name; its scientific title is *Scaphoideus luteolus*. They proved their point by letting a number of specimens feed first on the leaves of elms known to have the disease, then on healthy young seedling elms carefully protected against other possible insect carriers by cheesecloth cages and subsequent DDT spraying. The seedlings

ENGINEERING

Prevent Pipe-Corrosion

Connecting zinc cylinders to steel underground gives corrosion protection. This method is especially effective for remote areas too far away from electrical power.

➤ THE corrosion of steel underground, such as in pipes was adequately prevented over test periods ranging from three to six years by connecting zinc cylinders to the steel, the National Bureau of Standards has found in tests conducted by I. A. Denison and Melvin Romanoff of its staff.

Underground pipe lines have been widely and effectively protected from the corrosive action of the soil by the use of electricity for some time. If an electrical supply is handy, protection can be easily applied. But pipelines transmitting oil, gasoline and natural gas over vast distances are often too far away from electrical power to permit its economical use. It is for protection in these remote areas that the Bureau has sought improved methods.

Corrosion of steel in the soil is caused largely by electric currents set up by chemical action. Technically, it is often caused by differences in electrical potential of local areas on the corroding surface. Those areas whose potentials with respect to conventional reference electrodes are relatively high are designated as anodes, while areas of lower potential are known as cathodes. The electric current associated with corrosion flows toward, rather than from, the cathode areas. The cathode areas are not, therefore, subject to corrosion, but the anode areas are.

However, if sufficient current from an external source is caused to flow toward the corroding surface, the potential difference between the local anodic and cathodic areas is eliminated, and consequently the cause of corrosion.

A source of electrical energy for corrosion protection, in areas where underground pipe is removed from other electric power, can be provided by the galvanic corrosion of bars of the electronegative metals, zinc, magnesium or aluminum, buried at suitable intervals along the right of way and connected to the pipe line.

The Bureau's recent investigations were relative to the behavior of zinc anodes for cathodic protection in various types of soil. Experimental zinc-steel couples were installed at eight sites. The cathode

of the couple was a small steel ring, to which was connected either one, two or three zinc anodes. Unconnected steel rings and zinc cylinders were also buried at each test site. Data obtained, among other information, indicate the proper amount of current to give just the protection necessary.

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PHYSICS

Thundercloud Registers Highest Electrical Charge

➤ IN planes that were three times hit by lightning during the course of their researches, scientists of a joint Army-Navy team gathered data during the war on the electrical charges in various types of clouds.

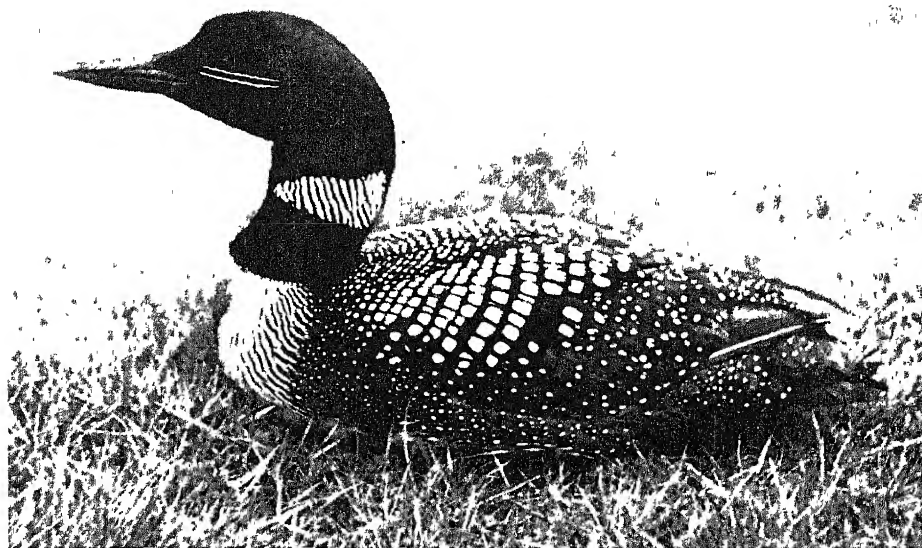
These modern Ben Franklins carried their instruments into the clouds to measure the electrical charges which Franklin is credited with first discovering in his famous kite experiment. A summary of the latest results is reported by Dr. Ross Gunn, now of the U. S. Weather Bureau, in the *Journal of Applied Physics* (May).

Most significant data were obtained by mounting one measuring instrument on the belly of a plane and one on its back, and expressing the differences in electrical potential between them in terms of volts per centimeter of distance.

Highest reading obtained was 3,400 volts per centimeter, registered while the plane was flying through an August thunderstorm. An instant later, a lightning-bolt hit the right wing-tip and tore out through the plane's nose. There were two other readings made in thunderclouds that were higher than 2,000 volts per centimeter.

By contrast, charges in ordinary, quiet clouds gave readings lower than 40 volts per centimeter when steady rain was falling, and lower than 10 volts per centimeter in clouds yielding no rain.

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TROUBLE ON THE TAKE-OFF—The loon is a capable flier, but it sometimes has flight trouble because of its massive weight and short wings. Once in the air, the bird flies at great speed with rapid wing beats. But its flight may be grounded by bad weather. When this happens, the loon does not crash. Results, however, may be just as disastrous to the bird. If forced down on land, the loon, a web-footed water bird, can only crawl along with the aid of its bill and wings. This makes the grounded loon easy prey of predatory animals.

CHEMISTRY

Antibiotic Discovered In Wood of American Tree

➤ ROT-PROOF qualities in the heartwood of Western white cedar or arborvitae may possibly be due to an antibiotic, or penicillin-like compound, newly discovered in this American tree species by two Swedish chemists, Drs. Holger Erdtman and Jarl Gripenberg, of the Royal Institute of Technology, Stockholm, and reported in *Nature* (May 8).

From an oil which two American chemists had extracted from this wood the Swedish scientists obtained a crystalline substance which forms ring-shaped molecules of the formula $C_{10}H_{12}O_2$. This seems to possess high germ-stopping powers. There are three varieties of this compound, differing only in the arrangement of the atom-groups within the molecule.

Drs. Erdtman and Gripenberg have named the newly identified substance "thujaplicin", from the botanical designation of the tree, which is *Thuja plicata*. It is a native to the west coast of North America, from Alaska to northern California. The three slightly different varieties of the compound they have named alpha, beta and gamma thujaplicin.

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VETERINARY MEDICINE

DDT May Be Effective Against Mange on Dogs

➤ DOGS afflicted with a particularly bad kind of mange may be cured by DDT, if results in early trials are confirmed.

The idea for using this anti-insect chemical for mange comes from Dr. Emilio Estrada, veterinarian of Guatemala City, C. A. He reports his experiences with DDT for mange in the *Journal of the American Veterinary Medical Association* (June).

The first case was in a two-year-old dachshund. That was three years ago and Dr. Estrada could not get rotenone to treat the condition. So he made up a 2.5% ointment with powdered DDT in vaseline and tried that daily for 10 days. By that time the hair was beginning to grow on the spot where it had fallen out and scrapings of the spot did not show any of the *Demodex* mites that were causing the condition.

Good results were also obtained in two other dogs after daily treatment for 15 days or every other day treatment for

20 days. A commercial rotenone preparation, when again available, was tried in several cases but in some had to be used for more than six months. In many of these cases the owners became dissatisfied and stopped the treatment or had the dog sacrificed.

While Dr. Estrada does not draw any conclusions from three cases, he thinks the DDT formula has merit. The one he now uses contains oil of thuja and zinc oxide as well as DDT. He thinks these help relieve the irritation and promote healing of raw surfaces, but he urges caution in treating large areas. No symptoms of poisoning were seen. He considers this especially noteworthy in the second case, since this dog licked much of the ointment off his lips.

The mange for which the DDT treatment was tried is called follicular mange. It is an intractable form due to the presence of mites in the hair roots.

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INVENTION

Batting Practice Machine Trains for Safe Hits

➤ YOUNGSTERS aspiring to be the Ted Williamises and Joe DiMaggios of tomorrow might do well to take some swings at an invention on which Robert V. Fessler of Indianapolis has received U. S. patent 2,443,131. It is a practice machine intended to train you into having your bat moving in that safe-hitting horizontal direction during the critical moment when it connects with the ball. Fellows who persist in a down-and-up-again swing are very likely either to top the ball for an easy grounder or to clip it underneath for an easy pop fly.

Mr. Fessler's invention provides a series of white-painted spots the size of a standard baseball, backed by rubber cushions, all mounted on a solidly planted and braced hardwood post. Rods from behind these targets ring a bell if you hit squarely. There is a whole vertical series of targets, representing all possible heights of fair pitches.

Just to make sure you don't get off any of that down-and-up-again stuff, the machine has a series of long rubber rods, reinforced with coil springs inside, sticking out between the targets. There is just enough space between any two of them for a bat to get in, if your swing is strictly on the level. If it isn't, these stiff rubber fingers give your bat the brush-off—and you don't ring the bell.

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IN SCIENCE

ENGINEERING

Diesel Locomotives May Haul Most Trains Soon

➤ DIESEL locomotives within a decade or less will haul most of the American railroad trains, the Society of Automotive Engineers, meeting in French Lick, Ind., was told by President J. W. Barriger, of the Chicago, Indianapolis and Louisville Railway Company.

Diesels already surpass steam locomotives in virtually all respects, he said, and rapid future progress in design and development will establish the diesel as definitely superior. While the diesel locomotive is the most expensive motive power unit, it can make even transcontinental runs with ease and dependability, and be ready for the return trip with only routine servicing.

Every four years, he stated, the railroads spend the equivalent of their original investment in steam locomotives in repairs to them. The gross annual expenses of owning and operating steam locomotives represent about 75% of the original cost of these machines. The low cost of diesel maintenance is greatly in their favor, he indicated.

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ENGINEERING

Auto Brake Adapted from Hydraulic Airplane Brake

➤ HYDRAULIC BRAKE for the automobile, a radically new type adapted from a wartime airplane brake, is claimed to have greater braking surface and more positive action than previous car hydraulic brakes.

The new automobile brake was developed by the Glenn L. Martin Company, of Baltimore, aircraft manufacturers, from its improved airplane brake. It has already proved satisfactory under actual road conditions but is not yet ready for marketing.

This Martin brake, which has no wheel cylinders, pistons and linkages, involves use of a continuous ring seal that fits in a groove in the shoe brake support. Hydraulic fluid, actuated by the brake pedal, enters this groove under the seal, forcing it outward and causing the brake shoe to make a continuous contact with the drum.

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E FIELDS

ORNITHOLOGY

Investigate Family Life Of Elusive Curlew

► THE only bird in North America whose nest and young have never been seen will have its family life intensively investigated this summer by an expedition that recently left for Alaska, under the leadership of Prof. A. A. Allen of Cornell University.

The bird is the bristle-thighed curlew, one of the numerous family of rather small shore birds with long, curved beaks. This particular species was first discovered in 1785 on Tahiti, and long was considered strictly a South Pacific bird. Then it was seen in 1869 in Alaska, and it is now considered certain that its breeding ground is in that territory.

Prof. Allen and his colleagues will use planes in seeking the nests of the elusive curlew. First establishing a base at one of Alaska's regular air fields, they will fly to the shores of upland lakes, then do their searching on foot. The first man to find a pair of the birds will pass the word to his scattered companions, and all will converge on that one area for more intensive hunting for the hidden nest.

The expedition is sponsored jointly by Cornell University and the National Geographic Society.

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ASTRONOMY

Five-State Search on for Persons Who Saw Fire-Ball

► A great fire-ball flashed in the early evening dusk of Monday, June 7, at 8:05 p.m. CST.

Spotted by an 18-year-old state Science Talent Search scholarship winner, Thomas Scott, who reported his observation to the American Meteor Society, the meteorite left a smoky train lasting four minutes as seen from Nauvoo, Ala.

Dr. Charles P. Olivier, director of the University of Pennsylvania's Flower Observatory at Upper Darby, Pa., believes that thousands of people must have seen the brilliant sight in the skies of western Tennessee, western Kentucky, southeastern Missouri, northeast Ark-

ansas and southern Illinois. Reports from all who saw it are requested by Dr. Olivier.

The piece of rock from outer space must have entered the earth's atmosphere about where Missouri, Kentucky and Illinois come together. People closer to it than the young observer, saw it more brilliantly and with a train lasting longer.

Scott, who is described by Dr. Olivier as the "best amateur meteor observer" in the society, will use his scholarship money, won in the Alabama State Science Talent Search, conducted by the Alabama Academy of Sciences with the cooperation of Science Service, to study with Dr. Olivier beginning next fall.

Scott is the son of a retired telegraph operator who now runs a truck farm. He lives in a small town of about 500 population and his favorite scientific hobby is watching and recording meteors from a hill near the town.

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ORNITHOLOGY

Birds Found to Use Tools In Search for Their Food

► SOME birds find that tools help them secure a juicy meal.

An outstanding example of a tool-using bird is the woodpecker-finch of the Galapagos Islands. In searching crevices for insects, the bird is handicapped by its rather short, thick bill. To offset this the woodpecker-finch picks up a slender, short length of stick or the spine of a prickly pear and with it pokes into cranies, states Dr. Austin L. Rand, curator of birds of the Chicago Natural History Museum. When the insects thus disturbed run out, the stick is dropped and the food seized.

The European song thrush feeds in part on snails and winkles. To get the soft edible animal out of its shell, it carries or drags the snail to a favorite rock and hits it against the rock until the shell is broken and its contents exposed.

A few other species bring shellfish to special places. "Herring gulls on our northeastern coast pick up mussels and clams and, flying over a rock or some other hard surface, drop the shellfish and follow it down," Dr. Rand states. "If the shell is broken, the dish is ready for the gull; if the shell is not broken the gull takes the shellfish up to a higher altitude and tries again."

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PUBLIC HEALTH

Blockade Is Deadliest Weapon in Anti-Rat War

► RAT-KILLING drives are all to the good, but for permanent results in the war on rats the blockade is the deadliest weapon, declared Albert M. Day, director of the U. S. Fish and Wildlife Service. Mr. Day spoke as guest of Watson Davis, director of Science Service, on Adventures in Science, heard over the Columbia network.

Depriving rats of free lodgings at man's expense is the first objective in the fight, the speaker pointed out, quoting the three-pointed slogan: "Build 'em out, starve 'em out, and finally kill 'em off." To deny rats living space, he continued, all buildings should be either on rat-tight concrete or masonry foundations or on two-foot concrete piers, higher than a rat can jump. All openings big enough to admit a rat should be securely closed. Backyard accumulations of rubbish should be cleared up.

Rat-proofing was learned the hard way in San Francisco, when rat-borne bubonic plague hit that city at the beginning of the century. All sorts of half-way measures were tried, but the plague kept on claiming victims. Finally an object lesson carried conviction: in rat-proofed Chinatown the plague stopped; in the nearby Italian settlement, which had not been rat-proofed, it persisted.

The "starve 'em out" objective can be realized partly through "build 'em out" measures, as these are applied to places where food is stored and handled. Requirement that all grain bins be metal-lined is being written into many municipal codes nowadays. Finally, every householder must do his share by putting all garbage in solid containers with tight metal lids which are carefully kept closed.

For the "kill 'em off" part of the campaign, safest effective rat poison is still red squill, since this is deadly to rats but not human beings and pet animals. ANTU may be used, though if a quantity is taken by accident it may make you sick. The most toxic of the newer rat poisons, 1080, is available only for specially trained professionals.

But however the rats are killed, emphasis returns to the "build 'em out" part of the campaign. For other rats will only move in after the original rat population has been exterminated if the premises are left in condition to invite such invasion.

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CHEMISTRY

Laws of Matter Up-to-Date

Compiled by HELEN M. DAVIS, Editor of CHEMISTRY
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1. A single ATOM is the tiniest particle of any chemical element that can exist by itself and retain the qualities that mark it as that element.

2. All material things in the universe known to our senses are composed of one or more CHEMICAL ELEMENTS.

3. Substances composed of more than one element are known as COMPOUNDS. Atoms of elements are held together in compounds by electrical forces in the outer parts of their structure.

4. The smallest theoretical unit of a compound, usually composed of two or more atoms, is known as a MOLECULE.

5. The smallest actual units of crystalline compounds found by use of microscopes and the electron microscope seem to be structures built up of the different atoms alternating in three-dimensional patterns to form the CRYSTAL LATTICE.

6. There were believed to be 92 CHEMICAL ELEMENTS, from hydrogen (${}^1\text{H}^1$) the lightest to uranium (${}^{92}\text{U}^{238}$) the heaviest, before the developments which led to utilization of atomic energy.

7. Two new elements, NEPTUNIUM (${}^{93}\text{Np}^{237}$) and PLUTONIUM (${}^{94}\text{Pu}^{239}$) were formed by neutron bombardment of Uranium 238.

8. Two additional new elements, AMERICIUM (${}^{95}\text{Am}^{241}$) and CURIUM (${}^{96}\text{Cm}^{248}$) have since been made by similar methods. More elements will follow.

9. When elements are represented, as above, by their chemical SYMBOLS, the subscript number is the atomic number. This is different for each element. The superscript number represents the atomic weight.

10. One of the qualities characteristic of matter is weight or mass. ATOMIC WEIGHT is expressed on a relative scale, as compared with the weight of hydrogen which is taken as one.

11. For convenience, the weights have been adjusted to make the atomic weight of the most abundant kind of oxygen 16.00. This shift makes most of the atomic weights nearly whole numbers, but changes that of HYDROGEN to 1.008. Physicists believe this fraction has significance for calculating the energy of nuclear reactions.

12. ATOMIC NUMBER is the measure of the electric charge on the nucleus of the atom. Atomic weight is the measure of the atom's mass.

13. Different samples of the same element, when tested by chemists, are sometimes found to have DIFFERENT ATOMIC WEIGHTS. Lead which occurs with radium, for example, has a different atomic weight from ordinary lead.

14. In all other ways the two kinds of lead are chemical twins, exactly alike except for weight. Elements which differ in weight only are called ISOTOPES.

15. Almost every element has been found to have a number of isotopes, some STABLE, some RADIOACTIVE. The atomic weight of the most stable isotope is generally used in listing the element.

16. Uranium has several isotopes. The

usual kind, whose atomic weight is 238, was used to produce the new elements. U-235 was used to make the ATOMIC BOMB.

17. The isotope U-235 and the element plutonium can be used for bombs because they are capable of FISSION.

18. When fission occurs the nucleus of the atom SPLITS into two (occasionally more) lighter elements, with release of nuclear energy.

19. In some recent experiments with a high-powered cyclotron, even more thorough fragmentation of atomic nuclei resulted. This process, resulting in many light elements, was named SPALLATION.

20. Different elements, quite distinct in chemical behavior, may have isotopes of the same atomic weight. We have ${}^{238}\text{U}$, ${}^{238}\text{Np}$, ${}^{238}\text{Pu}$, all with different properties. Such elements are called ISOBARS.

21. All atoms are believed to be composed of standard interchangeable parts. These are PROTONS, NEUTRONS and ELECTRONS.

22. Protons and neutrons make up the NUCLEUS of the atom. The structure of the atom is much like that of the solar system. The nucleus corresponds to the sun at the center. The planets are electrons.

23. The proton and the neutron each have a mass about equal to that of a hydrogen atom, which is 1 on the chemist's scale. Each is about 1800 times heavier than the electron. Particles called MESOTRONS or MESONS, intermediate in weight, are known, but their relationship to other atomic particles is as yet obscure.

24. The ELECTRONS, light in weight and some distance away from the heart or nucleus of the atom, revolve around the nucleus much as planets revolve around the sun. They are held in their courses by electric attraction.

25. The proton has a POSITIVE charge of electricity, the electron has a NEGATIVE charge equal and opposite to the positive charge of the proton. The neutron has no charge at all.

26. The difference in chemical properties of the elements is caused by difference in the number of protons in the nucleus. This is the ATOMIC NUMBER.

27. Chemical VALENCE, or combining power, is governed by the electrons in the outermost orbits of each atom.

28. Atomic weight is the SUM of the weights of the protons and neutrons in the nucleus.

29. It is the NEUTRON which figures in the transmutations which give atomic power. Neutrons can PENETRATE to the nucleus of heavy atoms when charged particles would be repelled by charges in the atom. The neutron is absorbed by the nucleus to form a heavier, unstable isotope of the element. This unstable isotope then decomposes radioactively, emitting an electron and changing to a new element one atomic number greater.

30. The HYDROGEN atom is believed to have just one proton as its nucleus, with one electron circling around it. Hydrogen's

atomic weight and atomic number are each one.

31. Hydrogen has an isotope which is just like ordinary hydrogen except that it is twice as heavy. It is known as "heavy hydrogen" and sometimes as DEUTERIUM (Symbol: D). Its compound with oxygen is called "heavy water."

32. The nucleus of HEAVY HYDROGEN contains one proton and one neutron. The atomic number of heavy hydrogen is one, corresponding to one proton. The atomic weight is two, corresponding to the two heavy particles, proton and neutron.

33. HELIUM has two protons and two neutrons in its nucleus. The two protons correspond to helium's atomic number two. The combined weights of protons and neutrons in the nucleus give helium its atomic weight 4. Two electrons, held in their orbits by the two protons, revolve around the nucleus.

34. The VOLUME of an atom is determined by the orbits of its outermost revolving electrons. Only a small fraction of the size of an atom is actually occupied by the protons, neutrons and electrons, just as the space occupied by the sun, the earth and other planets is only a small part of our solar system.

35. In spite of all the unoccupied SPACE, an atom is quite IMPENETRABLE to other atoms and to larger bodies. The electrons revolve millions of times a second, and keep everything out of the space within quite as effectively as though they were everywhere at once.

36. The only things that can get inside an atom are smaller things, FRAGMENTS of other atoms, protons, neutrons or electrons. They must be shot with just the right speed. These fragments of atoms are observed as radiations given off by radio-active elements.

37. RADIATION is wave motion, known to us as the electro-magnetic waves used for radio transmission, heat, light, X-rays and cosmic rays. Large numbers of extremely tiny particles in motion together act like waves.

38. Three types of rays are given off by radio-active substances. ALPHA particles are high-speed nuclei of helium atoms. BETA particles are high-speed electrons. GAMMA rays are electro-magnetic radiations similar to X-rays and light.

39. Of these, only the gamma rays are properly called radiations, and even these act very much like particles because of their short wave-length. Such a "particle" or quantum of gamma radiation is called a PHOTON.

40. Because their radiation is emitted as photons, the SPECTRA of elements are seen as bands of colored light, not as a continuous series of wave-lengths. Such bands are found also beyond the limits of visible light, but can be detected by photography.

41. Electrons in beta rays may be bent out of their straight-line paths by the influence of a magnet. This principle is used in the construction of the CYCLOTRON.

42. POSITRONS are like electrons, but are bent toward the opposite pole of the magnet because their charges are $+$ instead of $-$.

43 The kind of rays emitted and the HALF LIFE (the time in which half the radioactivity decays) is a constant characteristic of each radioactive isotope of every element, and is used to identify that isotope.

44. In general, the gamma rays are very penetrating, the alpha and beta rays less so. Even though the alpha and beta rays are not very penetrating, they have enormous SPEED.

45. The speed with which atom particles travel is the source of atomic energy. ENERGY is capacity to do work. It is work stored up for future use.

46. If you raise a weight to a height above the ground and suspend it there by some device, the WORK you put into raising it can be stored there indefinitely as POTENTIAL ENERGY. It will be there, ready, whenever you decide to release it.

47. The energy which a moving body has because it is in motion is called KINETIC ENERGY. The kinetic energy of any particle depends upon its mass and the square of its velocity. Energy is conserved by the moving particle until it strikes an object, then work is done.

48. All ENERGY is either potential or kinetic. Either one can be converted into the other. These two conversions are continually occurring.

49. Particles of atomic size have kinetic energy arising from several different kinds of MOTION. All atoms are constantly in motion.

50 If the atoms are so dispersed that the material constituting them is a GAS, that gas will exert pressure on all sides of the container that holds it, on account of the motion of the gas molecules.

51. Atoms which compose an element that will combine readily with another element, as hydrogen or carbon will combine with oxygen, have unsymmetrical arrangements of the outer electrons in their systems. These unsymmetrical arrangements tend to set up a sort of strain, which causes CHEMICAL COMBINATION to take place when elements with suitable combining powers are brought together.

52. These unsymmetrical arrangements give rise to FORCES which result in kinetic energy. This energy appears, for example, when carbon and oxygen burn to carbon dioxide, giving off heat, or hydrogen and oxygen explode to form water, again giving off heat.

53. Chemicals combining to form stable compounds give off energy in the process. These are known as EXOTHERMIC REACTIONS. Combinations which absorb energy, forming unstable compounds, are known as ENDOTHERMIC REACTIONS. Explosives, for example, which are highly unstable, are formed by endothermic reactions.

54. Chemical forces, electricity and heat are all forms of energy. Potential and kinetic energy may be distinguished in each case.

55. These energies all arise from motion of the atom as a whole, or motion resulting from attractions and repulsions between the outer PLANETARY ELECTRONS of the atom's structure.

56. Energy resulting from motion of particles deep within the structure of the atom was unknown until the discovery of RADIOACTIVITY.

57. Radioactive elements undergo SPONTANEOUS breaking up of their atoms, giving off alpha and beta particles and gamma rays. Loss of these particles causes the radio-active elements to change into other elements.

58 The energies shown in these TRANSFORMATIONS are thousands of times greater than the kinetic energies which the molecules of a gas have by reason of their motion when heated. They are thousands of times greater than the energy changes per atom in chemical reactions.

59. The property of matter that connects it with motion is INERTIA. Inertia is opposition to change of motion.

60. One conclusion that appeared early in the development of the theory of RELATIVITY is that the mass due to inertia of a moving body increases as its speed is increased.

61. This increase implies an equivalence between an increase in energy of motion of a body (kinetic energy) and an increase in its MASS.

62. It is for this reason that Einstein suggested that studies of radioactivity might show the EQUIVALENCE of mass and energy.

63. Einstein's statement is that the amount of energy, E, equivalent to a mass, m, is given by the equation $E=mc^2$ where c is the VELOCITY OF LIGHT.

64. From this equation, one kilogram (2.2 pounds) of matter, if converted ENTIRELY into energy, would give 25 billion kilowatt hours of energy. This is equal to the energy that would be generated by the total electric power industry in the United States running for approximately two months.

65 Compare this fantastic figure with the 8.5 kilowatt hours of heat energy which may be produced by BURNING an equal amount of coal.

66. Until the atomic power research program, no instance was known of matter being converted into energy without more energy being used to produce the transformation than was released by it.

67. Two axioms of physics state: (1) MATTER can be neither created nor destroyed; (2) ENERGY can be neither created nor destroyed. For all practical purposes they were true and separate principles until about 1940.

68. It is now known that they are, in fact, two phases of a single principle, for we have discovered that energy may sometimes be CONVERTED into matter and matter into energy.

69. Such conversion is observed in the phenomenon of nuclear FISSION, a process in which atomic nuclei split into fragments with the release of an enormous amount of energy.

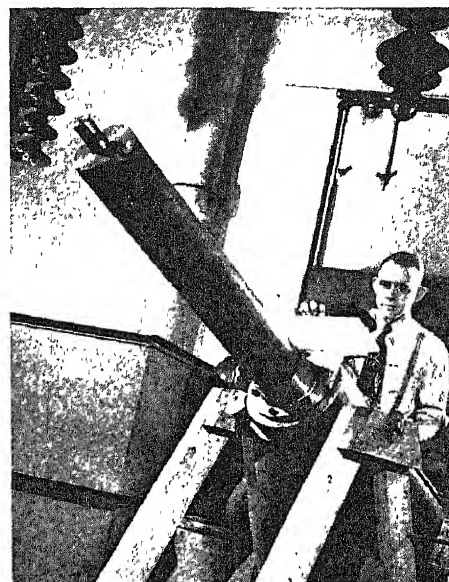
70. The extreme size of the CONVERSION FACTOR explains why the equivalence of mass and energy is never observed in ordinary chemical combustion.

71. We now believe that the heat given off in such COMBUSTION has mass associated with it, but this mass is so small that it cannot be detected by the most sensitive balances available.

72. Transformation of matter into energy is an entirely different sort of phenomenon than the usual chemical transformations, where the matter is changed into a different form but its MASS persists.

73. From the standpoint of the Laws of the Conservation of Matter and of Energy alone, transformation of matter into energy results in the DESTRUCTION of matter and CREATION of energy.

74. The OPPOSITE transformation, which astronomers believe may be going on in some of the stars, amounts to the destruction of ENERGY and the creation of MATTER.



HIGH-VOLTAGE GAS TESTER—
Breakdown limits of new types of gases for possible use in transformers, replacing oil, are determined in this "howitzer" at Westinghouse Research Laboratories. Up to 600,000 volts may be used; when the electrical surge becomes too powerful for the gas, it leaps from one electrode to another. Gas-filled transformers could be lighter and smaller than present types.

ENTOMOLOGY

Plant Growth Compounds Aid Mosquito Egg-Hatching

➤ MOSQUITO eggs are helped to hatch by some of the same chemicals that stimulate growth in plants. This renders all the more probable the suspicion held by many entomologists, that their eggs are similarly helped in nature by plant substances dissolved in the water on which they are laid.

Influence of synthetic plant growth-



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Do You Know?

Of the 96 *chemical elements* known to man, some 35 to 44 are used in most of today's automobiles.

Sodium phytate, a corn chemical, promises to be useful as a water softener, and in rustproofing and textile conditioning.

Infra-red light is used successfully to heat and dry pine tree cones to obtain the seed; it accomplishes in four hours what formerly required two days.

Ramie is a crop with a promising future in America; when its gum is removed, its fiber makes durable fabrics, and its dehydrated leaves make an excellent cattle feed.

ASTRONOMY

Two Faint Stars Found To Increase in Brightness

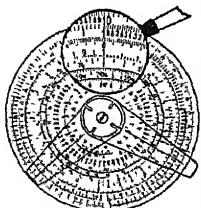
➤ TWO faint stars recently have been found to suddenly increase in brightness, according to reports received at Harvard College Observatory.

Dr. B. S. Whitney of the University of Oklahoma reported that photographic plates he made June 2 and 3 show a tenth magnitude star not visible several years ago. Its right ascension is 19 hours, 47.3 minutes; its declination is plus 36 degrees, 11 minutes. This discovery was confirmed by observations at Harvard's Oak Ridge Station.

The International Astronomical Union reports information from Moscow of the discovery of a ninth magnitude nova one degree south of Beta Serpentis. Thus "new star," far too faint to be seen without a telescope, is in the constellation of the serpent, now high in the southeast.

Science News Letter, June 19, 1948

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promoters on mosquito eggs was investigated by Albert Abel-Malek, in the laboratories of the Ohio State University. He used very dilute solutions of three of them: indole acetic, naphthalene acetic and indole butyric acids, as well as an infusion of bluegrass stems in water, and finally pure distilled water containing nothing else whatever.

The mosquito eggs hatched well on the three chemical solutions and the grass infusion, but the control eggs on absolutely pure water failed to turn out a single wiggler.

Mr. Abel-Malek presents a detailed report of his experiments in the *Annals of the Entomological Society of America* (March).

Science News Letter, June 19, 1948

PSYCHIATRY

Our Mental "Aching Back"

Author draws on his war experiences for suggestions, which he believes, will help us meet our aching back problems in civilian life.

➤ "OH, my aching back," GI Joe's favorite and most symbolic slang phrase during the war, applies to the whole world now and will for some time to come.

So declares Dr. William C. Menninger, general secretary of the Menninger Foundation and chief consultant in neuropsychiatry to the Surgeon General of the Army, 1943-1946.

A kind of prescription for warding off "the aching back" in these days of heavy world and personal burdens and stresses is to be found in Dr. Menninger's new book *Psychiatry in a Troubled World* (Macmillan). Dr. Menninger refers to the mental and emotional troubles, rather than a physical backache.

Drawing on his war experiences with the millions of "Joe's and Mary's from Brooklyn and Kokomo" who made up our huge war machine, he gives nine factors which helped the Joe's and Mary's stay normal in spite of war's stress and strain. These same nine, he believes, will help each of us meet our aching back problems in civilian life. They are:

1. Recognition of the existence of a struggle between the personality and the environment.
2. A job with a purpose.
3. Teamwork. Working with a group helps the worker as well as the group, is good for mental health.
4. Leadership. This works both ways, too. Most of us have to work under someone, but most of us also are leaders at times, either as parents, teachers, foremen or presidents of clubs.
5. Intellectual growth, getting new ideas, learning new things.
6. Promotion, for the individual and

for the family, the neighborhood, the city, the state and the nation.

7. Recreation.

8. Religion. Like most psychiatrists Dr. Menninger believes there is no antagonism between religion and psychiatry.

9. New awareness of emotional conflicts, of the occurrence of "operational fatigue" in civilian as well as military life.

Science News Letter, June 19, 1948

PHOTOGRAPHY

Gage Radioactive Elements In Rocks with Photography

➤ ESTIMATION of the amount of atomic energy elements, uranium and thorium, in rocks may be done in the future by photography.

Dr. J. H. J. Poole, and J. W. Bremner of Trinity College, Dublin, have placed special nuclear research photographic plates in contact with flat surfaces of rocks cut with a diamond saw and left them there for one to three weeks. Stars with two to five rays appear in the photographs caused by the alpha particles or the hearts of helium atoms that are given off from the radioactive elements.

Distribution of radioactive elements in rocks is shown to be very sporadic, especially in coarse grained rocks like granites, they declared in a report to *Nature* (June 5).

The photographic method was originally suggested two years ago by Mme. Irene Curie-Joliot, Nobelists herself and daughter of the Curies who discovered radium.

Science News Letter, June 19, 1948

PSYCHOLOGY

Musical Taste Tested

➤ THE old adage "No accounting for tastes" failed to receive scientific support from a survey of musical tastes of more than a thousand residents of Evansville, Ind.

Whether you would rather hear the Boston "Pops" Orchestra playing "Drink To Me Only With Thine Eyes" or Ted Daffan's Texans sounding off with "Beyond the Shadow of a Doubt" depends on your sex, your age, how much you have heard of either kind of music before and also upon your social class.

This was discovered in a survey conducted by Dr. Karl F. Schuessler, a sociologist now at Indiana University. He reports his findings in the *American Sociological Review* (June).

If you want to see how your own musical taste measures up, listen to the following records in addition to the two mentioned above: Bach, "Tocatta, Adagio and Fugue in C Major," by the Minneapolis Symphony Orchestra; "Sugar," a jazz piece played by the Capitol Jazzmen; Piston, "The Incredible Flutist," by the Boston "Pops"; Strauss, "Vienna Life," by the Andre Kostelanetz Orchestra; Tchaikowsky, "Andante Cantabile," by the Minneapolis Symphony; and "Time and Time Again," by the Wayne King Orchestra.

If you are a man, don't be too surprised if you don't care much for any of these pieces.

"The enjoyment of classical music in American culture is primarily a feminine reaction," Dr. Schuessler concludes as one result of the survey. More women than men like all types of music, he found.

Hill-billy music is the only kind preferred by more men than women.

Old people like old songs, the survey revealed. Persons 50 years or more old like "Drink To Me Only With Thine Eyes" and "Andante Cantabile."

As you might expect, musical training helps to account for your musical taste. Training makes people dislike jazz and hill-billy music. It does not, however, affect your liking for popular selections like the Wayne King record. Both untrained and trained ears delight in the Strauss waltz.

Your social and economic background affects your taste, too. Wealthy people enjoy classical music, while poor people like jazz and hill-billy, it was indicated.

Comparison between a group of 58 Negro girls and 78 white girls from about the same economic position showed that it is not the Negro that prefers jazz. The differences disclosed mainly that the Negro girls are less forced into a mold by definite standards of taste in their group. White girls have stronger opinions and are more enthusiastic about the waltz, jazz and popular music.

That religious training also influences your musical taste was revealed by the fact that some church workers refused to take part in the test. They informed the investigator that "only religious music is suitable for the edification of man."

Dr. Schuessler is now planning new studies which may help explain musical tastes within certain types of music. He also hopes to investigate the importance of your personality in your taste for music.

Science News Letter, June 19, 1948

ENTOMOLOGY

Flies Can Be Reared on Dog Biscuits and Yeast

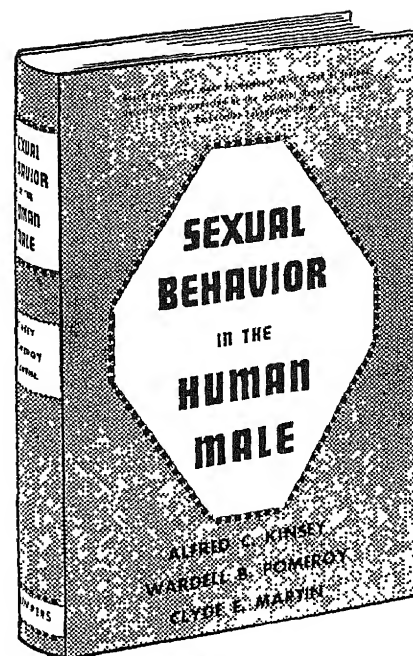
➤ FLIES by tens of thousands, needed for laboratory tests of the strength of DDT and other insecticides, as well as for research purposes, can be successfully fed through their infancy on moistened dog biscuit made to ferment by the addition of yeast. This new food for fly larvae is described by Dr. Hubert Frings, Pennsylvania State College entomologist, in *Science* (June 11).

Both houseflies and blowflies can be reared on this diet, despite the fact that in nature houseflies normally lay their eggs on horse manure and blowflies deposit theirs on decaying meat or other carrion. If the food mass becomes too moist while the larvae are growing, Dr. Frings adds coarse sawdust or fine wood shavings; the larvae take care of the mixing themselves.

Dog biscuits prove an exceedingly economical material for the mass rearing of flies. At current retail prices, one cent's worth provides food enough for 300 larvae.

After the flies emerge as winged adults they are kept in wire cages, on a diet of cube sugar, dry milk powder, and water. Flies thus fed provide a more dependable testing means for insecticides than their wild brethren brought up on slum rations.

Science News Letter, June 19, 1948



The KINSEY REPORT

In a recent Gallup public-opinion poll, overwhelming approval was given the publication of this book. Issued in the interests of better sex education and sociologic adjustment, this is definitely a report of great significance. Authorities acknowledge it to be one of the most important contributions to society to be made in the past 50 years.

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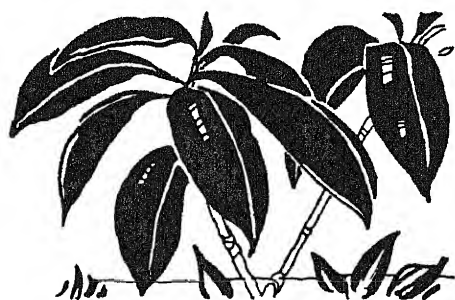
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Evergreen Ecology

► EVERGREENS, it hardly needs to be re-emphasized, include many plants besides the needle-leaved conifers: all palms and cycads, many ferns, most magnolias, bays and laurels, the Christmas hollies, arid-land succulents as diverse as century plants, yuccas and aloes—all these and many more are evergreens. An evergreen, briefly, is a plant that retains its foliage during seasons when food manufacture and growth are suspended, whether it be during winter storms or summer drought.

Evergreenness has its advantages. It enables the plants to get into action immediately upon the return of favorable weather, without waiting to unfold and expand leaves that have been stored in buds or hidden underground. This is particularly helpful in the far north and at high altitudes, where the growing season is short, and also in deserts where rains may be brief and unpredictably irregular in their occurrence.

But there are drawbacks, too. Because of the great expanse of surface which

leaves have to present to the sun in order to carry on their food-manufacturing business, leaves are great evaporators. And when water is lacking, as in the desert, or frozen into unavailability, as in arctic and temperate-zone winters, evergreen leaves are under really critical stress.

Apparently in response to these recurring water crises, a number of interesting water-saving devices have been developed in evergreen leaves. Their surfaces are sometimes greatly reduced, as in conifer needles and the "mouse-ear" leaves of some desert plants; they may have thick, waxy or horny skins, as on holly and magnolia leaves; there are often hairy, scaly or light-reflecting coverings that protect against excessive sunshine; the microscopic stomata or "breathing-pores" frequently are sunk

in pits or grooves. As an extreme development, leaves may be omitted altogether and the green food-making surface confined to modified stems, as in cacti and similar succulents, or in such "switch-plants" as Australia's casuarina tree and the ephedras of China and our own Great Basin area.

There are also internal protections against excessive evaporation. These usually take the form of a concentrated or thickened sap, containing high percentages of mucilage-like polysaccharides or sometimes of mineral salts. As is well known, it is easy to evaporate water out of a very thin syrup, but as the syrup becomes thicker evaporation becomes slower and slower. The sap of some evergreen plants seems to work on the same principle, saving at least the minimum of water necessary for survival.

Science News Letter, June 19, 1948

PHYSIOLOGY

Aging Traced to Brain

► WE grow old because our brains grow old, and our brains grow old because they cannot keep themselves young by dividing.

This theory of aging is proposed by a German husband-and-wife research team, Drs. Oskar and Cecilie Vogt of Neustadt in the Black Forest. They built their own private laboratory there when the Nazis deprived them of their jobs before the war.

The Doctors Vogt point out that one-celled animals remain immortally young, unless accidentally killed, because they are constantly dividing to form new individuals. Other cells remain young so long as they are actively dividing, and grow old as they shape up into mature form. To divide, cells must first pull in all projections and extensions of their protoplasm.

In the human brain, practically all cell divisions have been accomplished several months before birth; after that, only increase in size and complexity is possible. Furthermore, all brain and nerve cells have extremely long processes or extensions. These are essential, for it is through these that they carry on the body's communication.

However, these extensions cannot be drawn back, partly because they are so long and partly because they are firmly embedded in each other and in other kinds of tissues. So brain cells are unable to divide, and can only grow old.

The two researchers, incidentally,

deny emphatically that over-use will hasten the brain's aging process. On the contrary, aging is likely to be faster in a little-used brain.

Science News Letter, June 19, 1948

ARCHAEOLOGY


Ancient Bronze Shield Found in Danish Peat Bed

► ONE of the most beautifully ornamented bronze shields ever uncovered north of the Alps has been added to the collection of the Danish National Museum. The shield is of hammered bronze, with hundreds of various-sized indentations forming 21 systems of ornamentation.

Only 15 bronze shields are known on the European continent away from the Mediterranean, although about 30 of this period but of a different type are known from the British Isles. Archaeologists have fixed the age as 2700 years and the place of original manufacture as northern Italy.

Of four Danish bronze shields about which the places of discovery are known, three, including the last one, have been uncovered within a radius of six miles on the island of Falster. Since they were all found in peat beds that were lakes in the Bronze Age it is considered probable the shields were deliberately placed in the water as an offering to the gods of the lakes.

Science News Letter, June 19, 1948



Save-the-Redwoods

Send 10 cents each for these attractively illustrated pamphlets: "A Living Link in History," by John C. Merriam... "Trees, Shrubs and Flowers of the Redwood Region," by Willis L. Jepson... "The Story Told by a Fallen Redwood," by Emanuel Fritz... "Redwoods of the Past," by Ralph W. Chaney. All four pamphlets free to new members—send \$2 for annual membership (or \$10 for contributing membership).

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THE ALPHABET—A Key to the History of of Mankind—David Diringer—*Philosophical Library*, 607 p., illus., \$12.00. Beginning with primitive means of communication, this work traces the history of first non-alphabetic and then alphabetic writing. Written in a non-technical way interesting to the layman.

THE AMERICANA ANNUAL, 1948—An Encyclopedia of the Events of 1947—A. H. McDannald, Ed.—*Americana Corporation*, 777 p., illus., \$10.00. An account of a year that the editor terms one of "great confusion and disappointment."

ASTRONOMY—A Textbook for Colleges—William Lee Kennon—*Ginn*, 737 p., illus., \$ 5.50. The author points out that astronomy, in addition to being a worthwhile study in itself, provides a rich background for the other natural sciences.

BEGINNERS'S GUIDE TO WILD FLOWERS—Ethel Hinckley Hausman—*Putnam's*, 376 p., illus., \$3.50. Arranged by color for easy identification. Certain flowers are marked "pick sparingly" and others "do not pick at all."

GARDEN SOILS—Their Use and Conservation—Arthur B. Beaumont—*Orange Judd*, 280 p., illus., \$3.50. Liberally illustrated and clearly written especially for home gardeners.

HUMAN GEOGRAPHY—An Ecological Study of Society—C. Langdon White and George T. Renner—*Appleton*, 692 p., illus., \$6. Text for a beginning course in college geography. Beautifully illustrated.

MAGNETIC RESULTS FROM HUANCAYO OBSERVATORY, PERU, 1922-1935—H. F. Johnston and others—*Carnegie Institution of Washington*, 609 p., illus., paper \$3.25, cloth \$3.75.

MAGNETIC RESULTS FROM HUANCAYO OBSERVATORY, PERU, 1936-1944—H. F. Johnston and others—*Carnegie Institution of Washington*, 385 p., paper \$2.00, cloth \$2.50.

MICROWAVE TRANSMISSION CIRCUITS—George L. Ragan, Ed.—*McGraw-Hill*, 725 p., illus., \$8.50. Another in the MIT Radiation Laboratory series having to do with the principles and techniques underlying radar.

PROCEEDINGS VOLUME OF THE GEOLOGICAL SOCIETY OF AMERICA FOR 1947—*Geological Society of America*, 235 p., illus., paper, \$1.50.

PSYCHIATRY IN A TROUBLED WORLD—Yesterday's War and Today's Challenge—William C. Menninger—*Macmillan*, 636 p., \$6.00. Among the few good things that came from war, terrible as it was, we can count the awareness of the importance of our national mental health and its dependence on healthy emotions in the home. The author, who was Chief Consultant in Neuropsychiatry in the Army, evaluates the lessons taught by war.

Q. E. D.—M. I. T. in World War II—John Burchard—*Wiley*, 354 p., illus., \$3.50. A

description of what one privately endowed American institution, the Massachusetts Institute of Technology, contributed toward our victory over the Axis powers, as told by the director of libraries of the Institute.

READINGS IN BIOLOGICAL SCIENCE—Irving William Knobloch, Ed.—*Appleton*, 449 p., \$3.00. Selections from the writings of great naturalists presented in the hope of giving students an understanding of scientific method and "the forces that have reshaped our civilization and which now threaten to destroy it."

RECENT PROGRESS IN LAMINATED WOOD—*Northeastern Wood Utilization Council, Inc.*, 72 p., illus., paper \$2.00.

SCIENCE AND THE MODERN WORLD—Alfred North Whitehead—*New American Library*, 212 p., paper, 35 cents. A well-known book on philosophy originally published by Macmillan.

SMOKE—The Problem of Coal and the Atmosphere—Arnold Marsh—*Faber (Sherwood Press)*, 306 p., illus., \$7.00. A British publication about the problem of pollution of the atmosphere and how to combat it.

STUDIES OF HISTORICAL DOCUMENTS IN THE LIBRARY OF THE AMERICAN PHILOSOPHICAL SOCIETY—*American Philosophical Society*, 126 p., illus., paper, \$1. Including some new source materials on "B. Franklin, Printer."

SUBSURFACE GEOLOGIC CROSS SECTION FROM BACA COUNTY TO YUMA COUNTY, COLORADO—John C. Maher—*University of Kansas*, 11 p., map, paper, 25 cents. Prepared by Geological Survey, U. S. Department of the Interior with cooperation of State Geological Survey of Kansas.

TELEVISION—How It Works—John F. Rider, 203 p., illus., paper, \$2.70. A textbook for those who are learning to service these sets.

YOUR AQUARIUM—Brief, Clear Directions for Keeping Fishes and Plants in Health—William T. Innes—*Innes Pub. Co.*, 4th ed., 32 p., illus., paper, 25 cents. A beautifully illustrated booklet of hints to beginners.

Science News Letter, June 19, 1948

CHEMISTRY

Uranium Obtainable from Low-Grade Domestic Ores

► URANIUM, source of atomic energy, is now obtainable from low-grade domestic carnotite ores, by a new process on which U. S. patent 2,442,429 has been issued to two Ohio State University chemists, Dr. Ralph D. Nye and Prof. Dana J. Demorest. Release from dependence on overseas sources of higher-grade uranium ore might prove exceed-

ingly important to American economy and security.

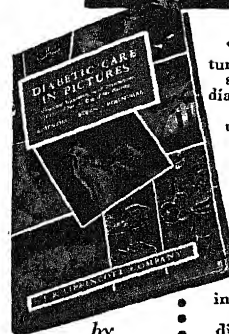
In the new process, the finely ground ore is first treated with a hot solution of caustic soda or potash. This dissolves the three valuable metals present in carnotite: uranium, radium and vanadium—the latter important in metallurgy. The dark, slimy solution is washed free of the worthless sandy mineral matrix of the ore by upward currents of water.

Then sulfuric acid is added to the solution, followed by the addition of barium chloride or other metallic salt. This precipitates a dark sludge which contains most of the vanadium; this can be removed and processed as an ore concentrate to obtain that metal. The clear liquid remaining, which contains the uranium and radium, is again treated with caustic alkali solution, which brings down a precipitate containing the valuable uranium and radium in concentrated form.

Science News Letter, June 19, 1948

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❁ **MOISTURE METER**, to determine when the lawn or garden has been watered to the desired depth, consists of a post to drive into the soil on which is a movable metal flag. On the bottom of the flag is a probe, adjustable in length, which is pushed into the ground. When the soil is wet down to the end of the probe, it softens and a spring pops the flag to the top of its post.

Science News Letter, June 19, 1948

❁ **TABLE MAT**, to protect the surface from hot dishes, is a grille-work of plastic strips standing on their edges. The heat-resistant plastic used is easily cleaned in warm water; the mat is stain-proof and will not warp.

Science News Letter, June 19, 1948

❁ **BULLETIN BOARD** is made of thin steel and notices displayed on it are held in place with small magnets instead of the customary pins and tacks. The magnets are a type containing aluminum, nickel and iron, and hold strongly to the steel board even through sheets of paper.

Science News Letter, June 19, 1948

❁ **MAIL BAG** is made of a fabric woven of fiber-glass yarn and coated with a vinyl resin. This new-type fire-resistant and waterproof pouch was developed for the Post Office Department and is particularly suitable for airmail.

Science News Letter, June 19, 1948



❁ **HAIR-TRIMMER**, shown in the picture, is a two-handed plastic comb with a razor blade attached at its center. The position of the blade is fixed where desired by a sliding thumb nut; any single-edged blade can be used.

Science News Letter, June 19, 1948

❁ **TOY FISH** for the youngster has a wiggling tail that propels it through water. The wiggle comes from inside mechanism operated by a spring which is wound up by a tiny crank in the snout of the fish. Water ballast controls buoyancy and permits submerged swimming.

Science News Letter, June 19, 1948

❁ **ENVELOPE-ADDRESSING** machine uses only a master tape and colorless fluid, without stencils, plates, ink or ribbons. Addresses are written with an ordinary typewriter on a long paper tape backed by a carbon strip. The tape will reproduce each address about 100 times.

Science News Letter, June 19, 1948

❁ **AUTOMATIC ICE** machine produces thousands of ice cubes a day, each with a pencil-sized hole through it. This hole penetrating the center of each prevents the cubes in storage from re-freezing and clumping together. The machine, which operates on household electric current, cuts itself off when its bin is filled with ice cubes and on again when the bin is emptied.

Science News Letter, June 19, 1948

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Other apparatus included—tiny flashlight bulb, litmus paper, cardboard washers, tinned copper wire, insulated copper wire, iron rod and iron filings with which you can perform experiments in electricity.

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Question Box

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ENGINEERING

What new method has been found to prevent pipe corrosion? p. 391.

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ORNITHOLOGY

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PHYSIOLOGY

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PSYCHOLOGY

What determines musical taste? p. 397.

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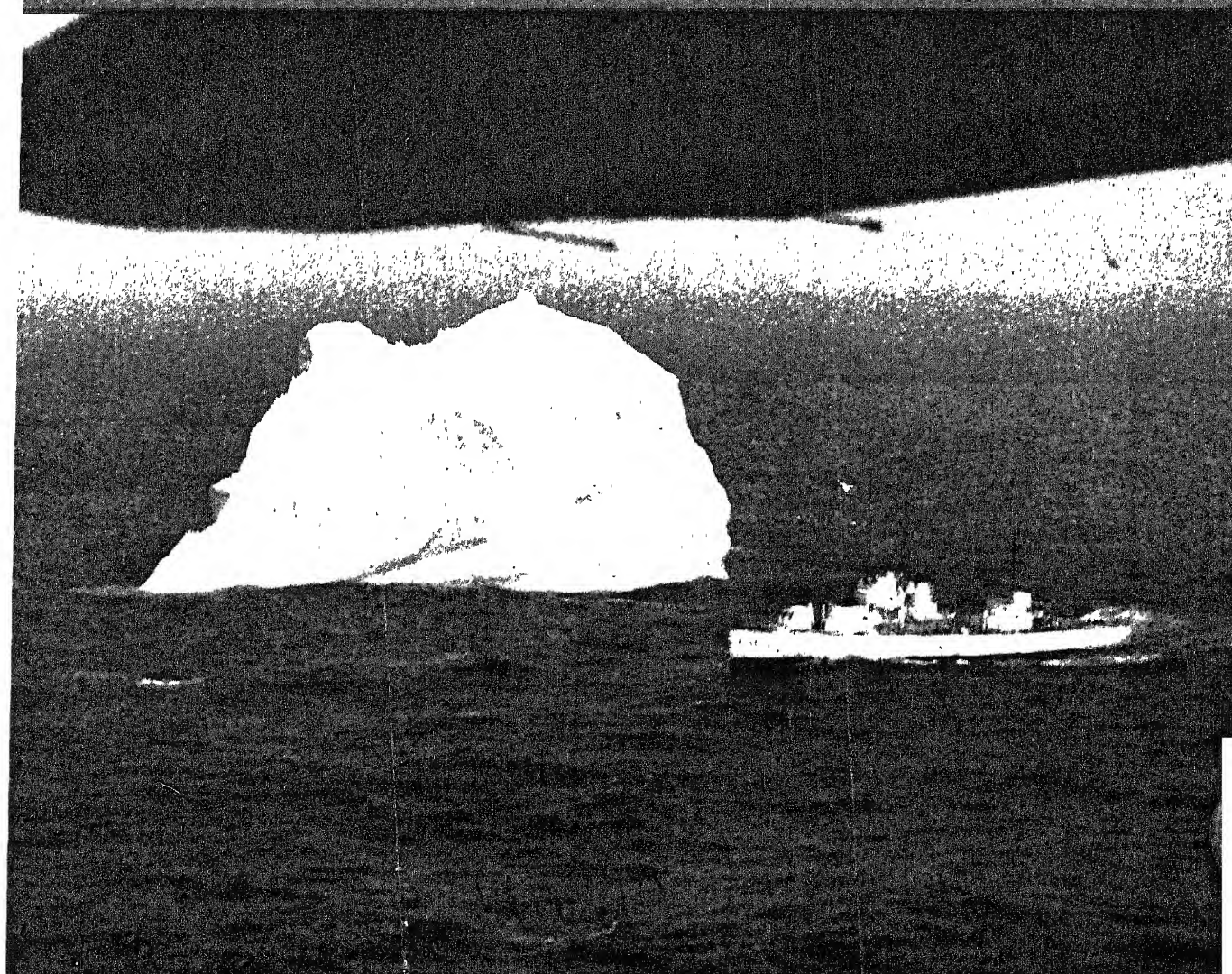
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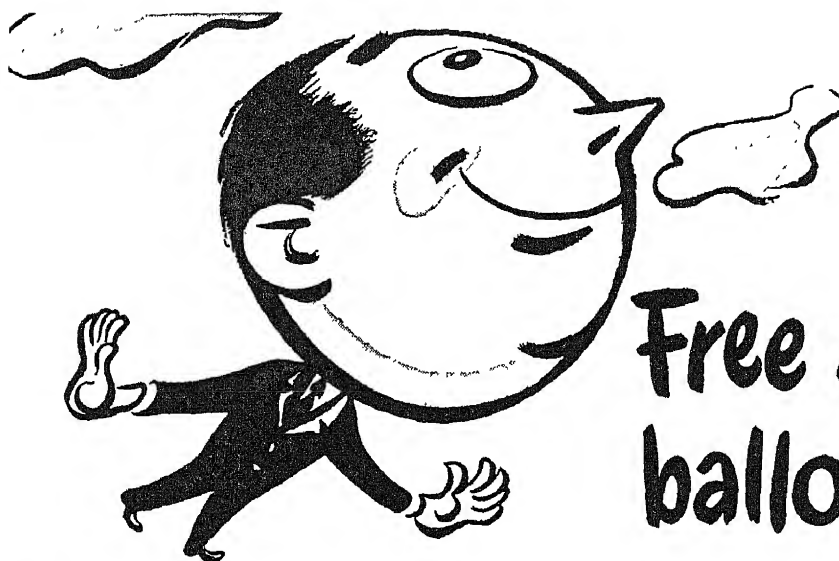
Vol. 37, No. 26

THE WEEKLY SUMMARY OF CURRENT SCIENCE • JUNE 26, 1948



Ice Patrol
See Page 405

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MEDICINE

Cancer Victory Nearer

Important atomic advances such as increased destruction following injection of radioactive colloidal gold may benefit stricken patients in the future.

➤ VICTORY over cancer seems nearer in view of advances reported by Atomic Energy Commissioner Lewis L. Strauss to a Senate appropriations subcommittee.

Cancer patients, however, should be warned not to expect immediate benefits from these advances. They are important steps along the road to victory but there are still many obstacles to overcome.

One advance involves the injection of radioactive colloidal gold, from the atomic pile at Oak Ridge, directly into cancers. This brings cancer-destroying beta rays from millions of point sources, instead of from six or eight, into play on the cancer. It means increased cancer destruction with less damage to surrounding healthy tissue. Dr. Paul F. Hahn of Vanderbilt University, Nashville, who developed this method of cancer treat-

ment, is as enthusiastic as any true scientist allows himself to be in the first stages of a new development. But he does not say he has a cancer "cure." More time must elapse before that can be determined.

Still far from application in cancer treatment but impressive in its possibilities is the second advance reported by Commissioner Strauss. This consists in successfully getting a cancer-destroying radioactive chemical to go directly to the part of the body desired, without any dangerous stops in healthy tissue. The success has been achieved in the case of one organ, the kidney, and so far applies only to rats, mice and rabbits. The chemical used is radioactive iodine. It is done by a kind of vaccination procedure. Advantage is taken of the fact that an ani-

mal will make antibodies to tissues of another species of animal when these get into the first animal's body. The antibodies are specific. If they are, for example, anti-rat kidney, they will go straight to the rat's kidney when injected into a rat. When mixed with radioactive iodine, they take this chemical along with them. The hope now is that the technic can be applied to directing radioactive chemicals to cancers in the human body. The work leading to this advance was done by Drs. David Pressman and Geoffrey Keighley of California Institute of Technology, now at Memorial Hospital's Sloan Kettering Institute in New York.

Science News Letter, June 26, 1948

MEDICINE

New Drug Under Trial As Possible TB Remedy

➤ TRIAL of a new drug as a possible remedy for tuberculosis is getting under way, Dr. Alfred Burger of the University of Virginia announced at the first national medicinal chemistry symposium sponsored by the American Chemical Society in Ann Arbor, Mich.

The drug is a Japanese cousin of quinine, called cepharanthine. Several drugs derived from quinine have been studied for possible use in tuberculosis but only cepharanthine has shown any promise, Dr. Burger said.

It was first isolated in Japan shortly before the war. It is now available in this country but since the studies have "barely started," no conclusions about its effectiveness can be drawn as yet.

Science News Letter, June 26, 1948

MEDICINE

Lung Peeling Operation Helps Some TB Patients

➤ NEW wrinkle in TB treatment is a lung peeling operation, reported by Dr. Paul V. O'Rourke of Detroit at the meeting of the National Tuberculosis Association in New York.

The operation consists in removing part or all of a membrane over the lung. Technically it is known as decortication, meaning literally the removal of the bark.

The peeling is done only when the lung is in a collapsed state. It is done to let the collapsed lung reexpand in cases where this is desired. An abnormally thickened membrane over the lung interferes with its reexpansion.

Science News Letter, June 26, 1948



DISEASE-CAUSING FUNGI—A complete laboratory is contained in this wall cabinet designed to provide doctors with a means of growing and identifying fungi as part of their office procedure in diagnosing ringworm, athlete's foot and other common fungus growths. It was designed by Dr. J. Walter Wilson, clinical professor of dermatology, University of Southern California Medical School, and Dr. Orda A. Plunkett, associate professor of botany, University of California, Los Angeles.

Lithgow Library

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MEDICINE

High Blood Pressure Aids

New drug from ergot helps to reduce blood pressure. Another effective aid is a nerve-cutting operation for patients with heart failure complications.

➤ A NEW drug for treating high blood pressure which looks "promising" in preliminary trials was announced at the Interamerican Cardiological Congress in Chicago.

The drug is called dihydroergocornine. It comes from ergot, drug long used to check hemorrhage in childbirth. Preliminary trials of it in patients with high blood pressure were reported by Drs. Ralph M. Tandowsky and Fred V. Cerini of Los Angeles.

Its action is based on functional blockage of sympathetic nerve impulses to the very smallest arteries. It is given daily by injection into a vein until the ideal blood pressure for the patient is reached. If results prove satisfactory it is then given in a liquid to be swallowed each day to keep the blood pressure at the desired level.

The new drug is not considered a cure for high blood pressure. The Los Angeles doctors call it a valuable aid in relieving the condition. It must be given with caution as it tends to be cumulative and this frequently agitates

the patients with high blood pressure.

A nerve-cutting operation to reduce high blood pressure may, contrary to previous medical opinion, be helpful in patients whose high blood pressure is complicated by heart failure.

Definite improvement for a long period has been obtained in eight of 11 such patients operated on, Drs. Ignacio Chavez and Luis Mendez of Mexico reported.

Heretofore heart disease and especially heart failure have been considered definite signs against the operation, though patients with this complication are precisely the ones who most urgently need lowering of the blood pressure, the Mexican physicians pointed out.

When medical treatment failed, they were forced to operate on such patients, some of them in extreme heart failure.

The improvement in the eight patients who survived the operation has lasted from one to two and a half years without further sign of heart failure. Some of them have resumed normal life.

Science News Letter, June 26, 1948

ENGINEERING

Saving Cost in Houses

➤ Suggested methods for designing small houses to have adequate strength without the use of more material than necessary are described in a new bulletin of the National Bureau of Standards. The objective is to cut building costs.

This report was prepared as a result of extensive studies and tests made by Bureau staff members who approached the problem with the same type of engineering principles as are employed in designing bridges. Copies are available from the Superintendent of Documents, U. S. Government Printing Office.

Saving costs through saving material and labor should result from the study. Strength to withstand snow, wind, impact and other loads, both on the exterior and the interior, is a first consideration. Application of engineering principles to the design of houses presents a complete and logical method for

determining allowable loads for walls, partitions, floors and roofs. The Bureau engineers followed the procedure of applying loads to specimens that accurately reproduce the most important structural parts of a house.

This approach permits the use of unconventional materials and unusual methods of construction. It determines the suitability for use of the many new types of building materials recently developed and available in panels or other forms for ready use in buildings.

Strength of houses in the past has been made adequate by patterning them after others that have stood the test of service conditions. They often have far greater strength, and include far more material, than is necessary. Present structures follow closely the traditional methods handed down from medieval England. From these traditions and building practices, building codes have been

formed that stand in the way of what might be modern construction.

This engineering approach to strength of houses will, the Bureau believes, open the way for designers to introduce unconventional materials and unusual methods of fabrication through laboratory tests to determine whether the constructions possess adequate strength. The Bureau believes also that the method will shorten the time required to develop new houses and reduce construction costs.

Science News Letter, June 26, 1948

An American company is planning to build *motorized rickshaws* for China.

Boys incur 15% more *surgical operations* than girls, a study of 100,000 surgical cases shows.

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NAVIGATION

Science Tracks Icebergs

War-developed radar, loran and underwater sound equipment helped find and track bergs in North Atlantic shipping lanes during the 1948 season.

See Front Cover

➤ PATROL planes, surface vessels, radar, loran and war-developed underwater sound equipment all played important parts in locating and tracking icebergs in North Atlantic shipping lanes during the 1948 iceberg season. It is an example of war science in peacetime applications.

The American part of this ice patrol is a function of the U. S. Coast Guard, which has performed this service since February, 1914. It is carried out under an international agreement, signed in January, 1914, whereby an international derelict destruction, ice-observation, and ice-patrol service was set up.

During February and March this year, the U. S. Coast Guard used converted B-17 planes to search for icebergs while flying on long trips over the water. Then in the latter part of April surface craft began patrolling because foggy and overcast weather decreased the value of aerial surveying. The picture on this week's cover of the SCIENCE NEWS LETTER was taken from a B-17 plane.

These surface vessels used radar to detect icebergs invisible to the naked eye. The bergs reflect the radar pulses much as other objects do, and the icebergs register as "pips" or images on the radar scope or screen. Once found, their exact geographical location was determined by loran. This is a navigation system developed during the war by which a surface vessel or airplane determines its position by two radio beams from separated land-based stations that are picked up by a special craft-borne receiver which computes the location by an automatic triangulation process.

Positions of all detected icebergs were reported by radio to all vessels in the neighboring waters. Underwater sound equipment, similar to that used during the war to locate submerged U-boats, was also successfully employed to locate icebergs. The underwater sound waves sent out by the equipment attached to the bottom of patrol vessels received back echoes from the submerged part of the icebergs just as patrol warships received

echoes from hidden submarines.

The Coast Guard, as a result of the 1948 patrol duty, predicts that 310 icebergs will this year drift south of latitude 48 degrees north, or approximately south of Newfoundland. This number, by comparison, is much less than the annual average of 431 bergs for the 48-year period 1900-1947. The trend this year is favorable to southward movement and off-shore distribution, indicating the probability of ice being a serious menace in the vicinity of traffic lanes to be considerably less than normal.

Science News Letter, June 20, 1948

AERONAUTICS

Thunderjet Fighter Now Equipped with Rockets

➤ EIGHT 140-pound rockets added to the six machine guns with which the plane is already equipped make the 600-mile-per-hour Air Force Thunderjet an unusually formidable combat weapon,

recent tests in Aberdeen, Md., at the Army's proving grounds, prove. As a result of these rocket firing tests the plane with the new equipment is now approved for military operation.

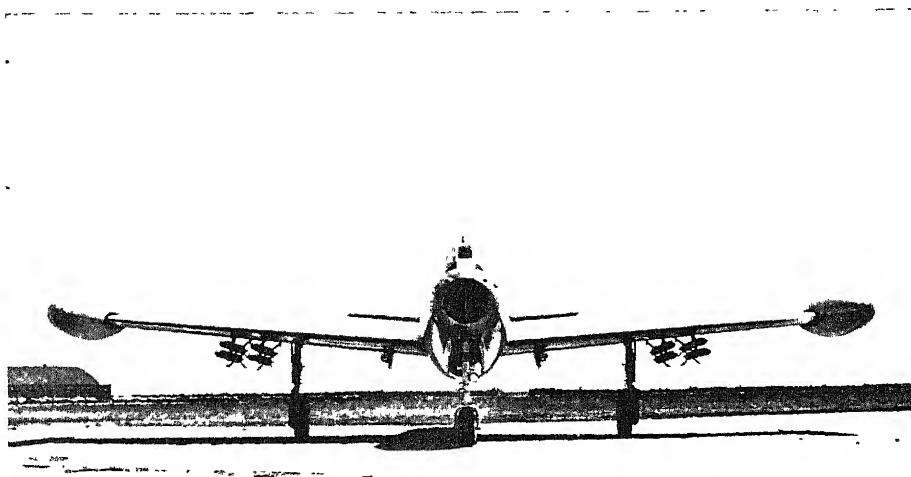
The Thunderjet is a fast, jet-propelled fighter plane built by Republic Aviation Corporation, Farmingdale, N. Y., with which the 14th Fighter Group at Dow Base, Bangor, Me., and the 20th group at Shaw Base, Sumter, S. C., are now completely equipped.

The eight rockets on the Thunderjet are carried four under each wing. They are fired individually by the pilot. During the tests here they were fired with a maximum velocity of 950 miles per hour from planes flying up to speeds of 500 miles an hour.

A unique feature of the rocket installation on these planes is the retracting rocket mounts. They automatically disappear into the wings when the rocket is fired. This eliminates speed-reducing obstructions under the wing after the rockets are on their way, permitting greater speed for get-aways.

The Thunderjet, one characteristic of which is its air in-take centered in its nose, is one of the Air Force's three production jet fighters. By the use of extra detachable fuel tanks carried on the tips of its wings, it has a range of over 1,000 miles.

Science News Letter, June 20, 1948



F-84 THUNDERJET—Eight, five-inch aerial rockets and six .50 calibre machine guns with 1,800 rounds of ammunition give this 600-mile-an-hour plane increased offensive power. After rockets are fired, the launching devices automatically retract to provide a streamlined wing surface.

MEDICINE

Hope for Heart Patients

Two anti-blood clotting chemicals, heparin and dicumarol, have been found to relieve the patient's heart condition and save lives.

► STRIKING improvement in the outlook for patients with a common form of heart disease comes from the use of two modern anti-blood clotting chemicals: heparin and dicumarol.

This is the verdict of a committee of the American Heart Association after reviewing the evidence in 800 cases. It is a verdict many physicians have been awaiting before daring to use the drugs for their own patients.

The committee's report was presented by its chairman, Dr. Irving S. Wright of New York, at the association's meeting in Chicago.

Treatment with these drugs, the committee recommends, "should be used in all cases of coronary thrombosis with myocardial infarction" unless there is a definite reason against it. A tendency to bleeding or hemorrhage would be one such reason.

Coronary thrombosis is the kind of heart disease in which one of the arteries of the heart muscle is plugged usually by a blood clot. Myocardial infarction is the damage to the part of the heart muscle that is not getting enough blood because of the artery stoppage.

The death rate and the number of complications in the way of repeated attacks of thrombosis during the first six weeks after an attack are "markedly lower" in patients treated with the anti-clotting chemicals than in patients treated by conventional means without these chemicals, the committee found.

The 800 patients in the study were under the care of 18 collaborating physicians in 16 different hospitals throughout the country. About half of them, those entering the hospital on the odd days of the month, received the anti-clotting chemicals. The others, entering on even days of the month, were given conventional treatment only. Age, sex and heart condition of patients in each group was about the same.

The chemicals act to relieve the heart condition by slowing the rate at which the blood clots. In using them, tests should be made daily to determine the clotting time of the blood. This precaution guards against giving too much of the chemicals, which might cause hemorrhage, and also is important for

guiding the physician to give enough to help the patient.

The greatest saving of lives occurred in patients over 60 years, the committee found. But the treatment is valuable for younger patients in reducing the number of further attacks.

Science News Letter, June 26, 1948

PUBLIC HEALTH

Increase in Death Rate Is Predicted for 1975

► AN increase in the death rate during the next 25 years is predicted by statisticians of the Metropolitan Life Insurance Company.

By 1975 we shall have at least one and maybe four more deaths per 1,000 population each year than the present 10 per 1,000.

But the average American will be living longer than he does now, the statisticians figure. It is this increased life span, they explain, that will increase the death rate.

An increase in the average length of life means that there will be a larger proportion of older people in the population. This in turn will lead to a larger number of deaths per 1,000 population.

"If the present death rate of about 10 per 1,000 continued," the statisticians point out, "it would ultimately result in an average lifetime of 100 years. In the present state of our knowledge, to expect that the average person will live that long would be to indulge in wishful thinking."

"Actually, the average length of life in the United States is now close to 67 years. In a stationary population, the death rate corresponding to this figure would be about 15 per 1,000, a figure half again that currently being experienced."

Science News Letter, June 26, 1948

PSYCHOLOGY

Propaganda Can Change Your Mind on Voting

► YOU may know how you will want to vote next November, or think you know, but propaganda can change your mind.

Studies made at a men's college last fall and reported in the *Journal of Applied Psychology* reveal the importance of propaganda in voting. Opinions on an important campus issue at the time—subsidization of athletes—were shifted 46% by campaign leaflets.

Few people could be induced to change from a "yes" to a "no," most of the shift was toward a neutral point of view. People, it seems do not like to do a mental "about face," though they can be influenced to change their minds one step at a time.

R. W. Dietsch, Cleveland, Ohio, and Herbert Gurnee of Arizona State College, who conducted the survey, found that the majority of the students were strongly in favor of subsidization before leaflets which argued against it were distributed.

A vote taken later showed that support of the position was weakened, with a large swing being made to a neutral position.

The propaganda worked best with one leaflet. Series of three and then of five leaflets were also used. There was little change after the first series and even less after the second. The heavier propaganda proved to be worth neither the trouble nor the expense.

Science News Letter, June 26, 1948



DUTCH POST-WAR CAR—First since the war, the "Gatso" can travel, by use of extra gas tanks, 900 miles on one load of gas. Claimed to do "105 m.p.h.," the mileage secret is in overdrive and clever gear ratio. It is streamlined with a plastic top which is removable and sells for the equivalent of \$4,200.

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ASTRONOMY

Vega Now Brightest Star

One of a trio of stars, it makes up a triangle with Arcturus and Deneb. They are glowing globes of gas, shining by their own light.

By JAMES STOKLEY

► **BRIGHTEST** star to be seen on the evenings of July is Vega, in Lyra, the lyre, which is in the eastern sky as indicated on the accompanying maps. These show the appearance of the heavens about 11 o'clock, daylight saving time, at the beginning of the month, and an hour earlier around the 15th. Vega is one of a trio of stars which make an easily located triangle. The others are Arcturus, in Bootes, the bear driver, lower and farther south; and Deneb, in Cygnus the swan, which is about as high and farther north.

Each of these stars is a glowing globe of gas, like our sun, shining with its own light. But three planets, shining by reflected sunlight, can also be seen these evenings. Only two appear on the maps, as one sets a little earlier. This is Saturn, in the constellation of Leo, the lion, of which only the hind quarters are shown. In the part below the northwestern horizon visible until perhaps 10 o'clock at the beginning of the month, is the bright star Regulus, and Saturn is near it.

Jupiter Brightest Planet

Jupiter is the brightest planet, and is seen in Ophiuchus, the serpent-bearer, in the southern sky. This figure is not one of the 12 constellations of the zodiac, through which the planets are commonly said to move. Considerably fainter is Mars, low in the west, in Virgo.

There are three other stars of the first magnitude, in addition to those already mentioned. One is Spica, in Virgo, the virgin. Another is Antares, in Scorpius, the scorpion, near Jupiter. The third is Altair in Aquila, the eagle, toward the southeast.

Late in the night other planets appear. Venus, so brilliant as an evening star during the winter and spring, has now shifted to the other side of the sun, becoming a morning star, visible in the east before sunrise. At the middle of July, it comes up about two hours ahead of the sun. On July 16, Mercury is farth-

est west of the sun, and around that date can be seen, below Venus, low in the eastern sky in the glow of dawn.

Although the earth revolves around the sun once every year, it seems as if the sun travels around us once in that period. As our planet stands in different directions from the sun, we see it in different directions—against an ever-changing background of more distant stars. Thus it traces out among the constellations an imaginary line called the ecliptic, which is actually the projection in the sky of the plane in which the earth moves.

Along Ecliptic Plane

Since the planets move in approximately the same plane, their motion, too, is nearly along the ecliptic. Of the planets visible to the naked eye, Venus can get as far away from it as 9 degrees, which is about 18 times the apparent diameter of the full moon; Mars about 7 degrees; Mercury 6 degrees; Saturn 3 degrees and Jupiter 2 degrees. Thus, a belt across the sky, 18 degrees wide, with the ecliptic marking its middle, forms the region in which the sun, moon and planets always appear. This is called the zodiac, or path of the animals, since most of the constellations in it are named after animals.

Ordinarily it is said that there are 12 constellations of the zodiac, namely,

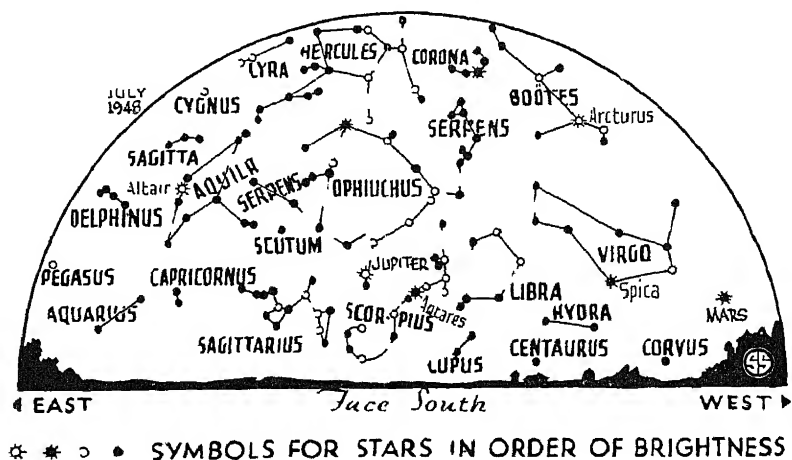
Aries, the ram; Taurus, the bull; Gemini, the twins; Cancer, the crab; Leo, the lion; Virgo, the virgin; Libra, the scales; Scorpius, the scorpion; Sagittarius, the archer; Capricornus, the sea goat; Aquarius, the water carrier and Pisces, the fishes.

However, as noted above, Jupiter during July is in the constellation of Ophiuchus, not officially a part of the zodiac even though it contains more of the ecliptic than does Scorpius. While they do not include any part of the ecliptic, the constellations of Orion, the warrior, Cetus, the whale and Auriga, the charioteer, also extend into parts of the zodiac. Thus, it is possible to see planets in any one of these groups.

All this helps make ridiculous the beliefs of superstitious persons that the planets and their positions in the sky have some mysterious effect on our lives, particularly the way they were arranged at the time of birth. Ophiuchus, Orion, Cetus and Auriga are not recognized, even though the planets can be in these as much as in any of the official 12.

Signs of Zodiac

Moreover, even the chosen dozen are not recognized, for what is considered is not the actual constellation. For such purposes, the zodiac is divided into 12 equal parts, called signs. Their names are the same as the formal zodiacal constellations, but they do not correspond to them. The sign of Aries, for example, is in the constellation of Pisces. There was a time, several thousand years ago, when the signs and constellations approxi-



Do You Know?

During the past two centuries more than 100 kinds of *birds* have become extinct.

Using a *disinfectant* on handkerchiefs has been suggested as one step toward stopping the spread of the common cold.

Dipping the roots of sweet-potato plants in *charcoal*, when transplanting into soil that has been treated with 2,4-D to kill weeds, seems successful in protecting the crop from injury.

Salt-containing *crude petroleum* is cleared of this impurity by a process which involves passing a heated mixture of the crude and water through a bed of fiber glass; when the water is separated out it carries the salt with it.

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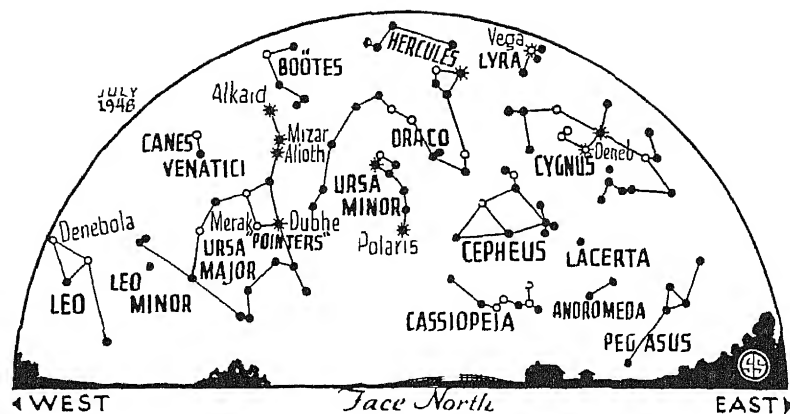
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mately corresponded. Now, owing to a movement in the heavens called "precession" they have shifted and are getting farther apart all the time. Such superstitions, it seems, false at best, do not need to keep up to date!

Time Table for July

July	EDST	
4	1:00 p. m.	Earth farthest from sun, distance 94,456,000 miles.
5	12:07 p. m.	Moon passes Venus
	2:27 p. m.	Moon passes Mercury
6	5:09 p. m.	New moon
8	10:00 a. m.	Moon nearest, distance 224,500 miles
9	1:39 a. m.	Moon passes Saturn
11	11:51 a. m.	Moon passes Mars
13	7:30 a. m.	Moon in first quarter
16	4:00 a. m.	Mercury farthest west of sun
17	9:11 p. m.	Moon passes Jupiter
20	10:31 p. m.	Full moon
23	11:00 p. m.	Moon farthest, distance 252,200 miles
28	early a. m.	Meteor shower visible, radiating from constellation of Aquarius. (The bright moon will interfere considerably)
29	2:11 a. m.	Moon in last quarter
31	4:00 a. m.	Venus at greatest brilliancy.

Subtract one hour for CDST, two hours for MDST, and three for PDST.

Science News Letter, June 26, 1948

MEDICINE

Way to Lessen Ear Damage From Streptomycin Found

➤ INNER ear damage that sometimes is caused by streptomycin treatment might be prevented by desensitization, two Columbia University ear researchers reported at the meeting of the National Tuberculosis Association in New York. They are Dr. Edmund P. Fowler, Jr., and Carl R. Feind.

Since tuberculosis patients getting streptomycin treatment must take the drug for weeks or months, the dizziness and other symptoms from its toxic effects on the inner ear may be troublesome. Some patients are extremely susceptible, others very resistant to this effect of the drug. In rare cases the hearing mechanism is also affected, but this is often reversible.

In experiments with cats and sala-

manders, Dr. Fowler and Mr. Feind found that the toxic effect of streptomycin on the vestibular system of the inner ear can be modified by desensitizing the animals before giving a toxic dose.

Science News Letter, June 26, 1948

MEDICINE

New Drug for Epilepsy Shows Promise in Trials

➤ A NEW DRUG for epilepsy which has already proved itself in extensive clinical trials was announced by Dr. M. A. Spielman of Abbott Research Laboratories, North Chicago, Ill., at the first national medicinal chemistry symposium of the American Chemical Society in Ann Arbor, Mich.

The new drug is called Phenurone. It is a synthetic compound made from phenobarbital. Phenobarbital, one of the modern sleeping medicines, has itself been used to treat epilepsy.

Trials of the drug on patients were conducted by Dr. Frederick Gibbs of the University of Illinois College of Medicine, Chicago. He reported to Dr. Spielman that Phenurone showed considerable promise and can be widely applied to all three common types of epilepsy—petit mal, grand mal and psychomotor epilepsy.

Science News Letter, June 26, 1948

AERONAUTICS

15 Turbo-Prop Engines Being Developed by British

➤ FIFTEEN types of British gas-turbine-propeller engines for airplanes are either in actual use or in various stages of development, it is revealed by the Society of British Aircraft Constructors, Ltd. This type of engine, known as the turbo-prop, is a gas turbine which drives conventional propellers.

Great Britain claims her mounting achievements in turbo-props is giving her an established lead in this field, matching the claimed lead in the turbo-jet field. All of the engines under development may never reach the production stage, but the experimental work done will add to turbo-prop knowledge.

In the three years since the Trent-engined Meteor, the world's first turbo-prop powered airplane, took the air the carefully planned program of turbo-prop development has gone steadily on. One of the latest installations is that of an

Armstrong Siddeley turbo-prop now used to power the Balliol Air Force trainer. This engine replaces a Mercury piston engine formerly used in this plane.

The Balliol is an all-purpose advanced service trainer and is designed to meet the training requirements of day or night flying, gunnery, navigation, bombing, photography and glider towing. Instructor and student sit side by side in a roomy cabin with a fine all-around view. This land-based plane can easily be adapted for carrier deck landings.

Science News Letter, June 26, 1948

AERONAUTICS-METEOROLOGY

Make Safe-Speed Charts

➤ **SAFE-SPEED** charts for airplanes in thunderstorms are the results of the so-called Thunderstorm Project carried out by the U. S. Air Force in the Ohio-Indiana area during the past two years. During the study especially equipped planes made 2,000 flights high above the earth within the thunderstorms themselves, and recorded all weather conditions encountered.

The research was made by Air Force crews in Air Force planes, under technical direction of the U. S. Weather Bureau. The National Advisory Committee for Aeronautics and the Navy furnished considerable meteorological equipment. The resulting charts, for use of pilots, show the airspeed limits within which nine types of transport and cargo planes of various weights can be most safely operated during thunderstorms.

The Air Force's Black Widow, the P-61, was the plane used in the studies because of its construction, stability and high-altitude performance. All planes were radar-equipped, and carried all sorts of instruments to record automatically all weather conditions encountered in flight, also stresses on the body of the plane and the electric content of the outside atmosphere.

Five planes were used as a team to study a single storm. Approaching thunderstorms were located by ground-based radar, which also kept track of the planes after their take-off. The aircraft entered the storms at altitudes of 6,000, 10,000, 15,000, 20,000, and 25,000 feet. This enabled the observers to get a complete picture of storm conditions at all altitudes at which military and commercial planes might operate. Instrument records, photographs and ob-

servers' notes were all used in making up the thunderstorm safe-speed chart.

Science News Letter, June 26, 1948

MEDICINE

Mass Screening Technic Aids Cancer Cure Search

➤ Search for a chemical cure for cancer is being aided by a mass screening technic similar to that used in the wartime search for anti-malaria chemicals to replace quinine.

The screening is being done by the CBCC, which is the short name for the Chemical-Biological Coordination Center in Washington. The CBCC is operated by the National Research Council with funds from the Army, Navy, National Cancer Institute and American Cancer Society.

Hundreds of thousands of chemical compounds, made by industrial, government and university laboratories, will be catalogued by mechanical minds and fingers in the CBCC machines for their biological activity.

Of some 4,000 already catalogued, 800 have been sent to collaborating university and government laboratories for testing as possible remedies against cancer and other diseases.

Science News Letter, June 26, 1948

ENGINEERING-RADIO

Radio Communications in Mines Found Successful

➤ **LIVES** of miners entrapped underground may be saved by a radio communication system, using low-frequency waves, developed by the U. S. Bureau of Mines. The human voice was success-

fully transmitted through ground strata alone, and also by way of trolley wires, pipes and other metallic installations.

Radio communication was made between the surface and underground workings, and also between widely separated points underground. Tests have been made in three bituminous mines, three anthracite collieries, a salt mine and an iron mine. These mines were located in both eastern and western mining districts.

The sending and receiving set used on the surface was run by a 110-volt current, and that underground by a 6-volt storage battery and a vibrator power pack. The power of the transmitter was two to three watts. In addition to successful communication between underground workings and the surface through the ground strata and between different points within the mines, communication was held between the hoisting engineer and moving or standing cages and cars in shafts and slopes.

Science News Letter, June 26, 1948

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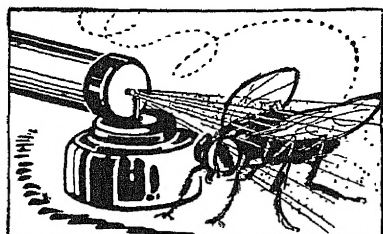
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Fly Rhymes of the Times

➤ FLIES have not long been the objects of loathing and fierce hostility that they are now. Older persons still living can remember a time when few houses had screens, and when flies were regarded as nuisances only when too many of them drowned in the milk or got stuck in the butter on the table.

Individual flies were even regarded as interesting objects of natural-history study, like birds or squirrels. This attitude is well exemplified in the well-known but now happily obsolete nursery jingle beginning:

"Baby bye, here's a fly,
Let us watch him, you and I!"

About the turn of the century, when the fly's true nature as a feeder on filth and a carrier of disease germs became better known, it ceased to be regarded as a fit inmate of the nursery—or of anywhere else in the house. Fly-swatters began to sell heavily in the five-and-ten-cent stores, and some one revised the old rhyme to go:

"Baby bye, here's a fly,
Let us swat him, you and I!"

But swat-the-fly campaigns were soon

demonstrated as inadequate by themselves to keep down the swarms of flies. Fly numbers in cities did diminish, but this was largely incidental to the development of the automobile and the disappearance from urban areas of manure piles, natural nurseries of flies. Some of the earlier insecticide sprays, based on pyrethrum and rotenone, were helpful, too.

Opportunity for a real cleanup came with the recent development of DDT as the killing ingredient of household sprays and area fogs. Where swatters slew their mere tens, DDT now slays its tens of millions. So the old jingle might well be revised again:

"Baby bye, here's a fly,
DDT him and he'll die!"

However, final victory in the war against flies depends not so much on the mass slaughter of adult insects as on mass prevention of their existence. This will come mainly from the cleaning up of their breeding-places in both city and country, plowing under of manure, burning or burial of garbage and other possible maggot-foods. When this has been accomplished, flies will become so rare that a final revision may be possible:

"Baby bye, here's a fly,
How the deuce did he get by?"

Science News Letter, June 26, 1948

MEDICINE

Community Bone Bank

➤ COMMUNITY bone banks, with deep freeze cabinets something like those in which families in many communities store food, will be established in the near future, if recommendations of Dr. J. R. Cobb of New York are followed.

Dr. Cobb's statement of the need for community bone banks to supply surgeons with bone grafts of every size and description appears in the *Journal of the American Medical Association* (June 12).

Good results in grafting bones from banks are reported in the same issue by

Dr. Leonard F. Bush of Danville, Pa and Dr. C. Zent Garber of New York.

In 104 bone graft operations, complications occurred in only four, they report. In 24 cases, the bone was grafted directly from donor to patient. In 37 it was grafted after being kept in a bank at a temperature slightly above freezing. In the other 43 cases, the bone had been stored in a deep freezer.

Science News Letter, June 26, 1948

Only the *driest areas* of America are free from poison ivy, poison sumac or poison oak.

ERRATA, Vol. 53, Nos. 1-26, January-June, 1948

PAGE	TITLE BEGINS	CORRECTION
6	Elm Disease Remedy	Col 2, line 7, to read 47% of the crowns of the untreated trees; line 9, to read 29% of the crowns of the treated trees.
34	Fish Yield at Streams	Line 1, to read Adding farm fertilizer to a; Col. 2, line 1, Bank for water, two for three; line 4 to read Increases in the; line 5, were noted for took place.
38	Navy Doctors Join Safari	Col. 3, par. 5, line 6, Hoogstraal for Hoogstaal.
74-75	Planets Illuminate Sky	January maps used.
91	Canals Retain Importance	Col. 3, par. 3, lockless sea level canal, see SNL, 3, p. 207.
111	Sex Influences Malaria	Line 7, B. E. for B. F.
119	Vitamin E Relieves Pain	Par. 2, Line 1, after called insert a lesion of the; line 2, delete or Dupuytren's contracture. Line 4 to read a lesion of the palmar fascia, or Dupuytren's contracture.
149	Science Talent Institute	Col. 2, line 20, chemistry for medicine and physiology.
151	Caption	Chemistry for medicine and physiology.
164	Dr. Wendell M. Stanley	Chemistry for medicine and physiology.
172	Atomic Particle Created	Line 8, 400,000,000 for 400,000.
180	Mass Detection of Cancer	Line 5, Medical College for Hospital.
309	Caption	First sentence to read: Details of unstained guinea pig intestinal wall revealed by phase microscope. For invisible read unclear. Photograph by Department of Embryology, Carnegie Institution of Washington, Baltimore, Md.
342	Psychotics Have Defect	Col. 3, par. 4, line 1, after Cushing insert and Dr. Mary M. Cushing.
396	Plant Growth Compounds	Abdel-Malek for Abel-Malek.



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BACTERIAL BLIGHT OF COTTON UNDER CONDITIONS OF ARTIFICIAL INOCULATION—Richard Weindling—*Govt. Printing Office*, 59 p., illus., paper, 20 cents.

CALIFORNIA MINERAL PRODUCTION FOR 1946—C. V. Averill, C. R. King, Henry H. Symons and F. F. Davis—*California Division of Mines*, 176 p., illus., paper, 75 cents (plus tax for Calif. residents).

THE CHEMICAL FORMULARY: A Collection of Valuable, Timely, Practical, Commercial Formulae and Recipes for Making Thousands of Products in Many Fields of Industry, Volume VIII—H. Bennett, Ed.—*Chemical Publishing Co.*, 448 p., \$7.00. Recipes for a great variety of things from lemon pie to waterproof matches.

CHEMISTRY OF THE CARBOHYDRATES—William Ward Pigman and Rudolph Maximilian Goepf, Jr.—*Academic Press*, 748 p., \$10.80. A specialized monograph bringing together previously unassembled material of interest to chemists who are not specialists in the carbohydrate field.

NATURAL GEOGRAPHY OF THE MODERN TARASCAN AREA—Robert C. West—*Govt. Printing Office*, 77 p., illus., paper, 75 cents. One of a series of monographs reporting results of joint investigations of the U. S. Institute of Social Anthropology and the Escuela Nacional de Antropología de México.

ESSAYS ON HISTORICAL MEDICINE—Bernard J. Ficarra—*Froben*, 220 p., illus., \$5.00. Not a technical book, but one for the general reader.

FROM THE GROUND UP: Facts and Figures of the Mineral Industries of the United States—Paul M. Tyler—*McGraw-Hill*, 48 p., illus., \$3.50. The important factual material necessary for establishing wise national policies concerning basic raw materials.

GENERAL AND APPLIED CHEMISTRY: A Brief College Course—Arnold J. Currier and Arthur Rose—*McGraw-Hill*, 275 p., illus., \$3.00. Intended for students of agriculture, home economics and other applied sciences.

BOOK OF SOUTH AMERICAN INDIANS, VOLUME 3: THE TROPICAL FOREST TRIBES—Julian H. Steward, Ed.—*Govt. Printing Office*, 986 p., illus., \$4.50. A wealth of material about the indigenous peoples of South America and their customs, art, music and religion.

OSTATIC AGENTS: With Particular Reference to Thrombin, Fibrinogen and Absorbable Cellulose—Walter H. Seegers and Elwood A. Sharp—*Thomas*, 131 p., illus., \$4.75. Based on developments during the past few years.

THE JORNADA BRANCH OF THE MOGOLLON—Donald J. Lehner—*University of Arizona Press*, 99 p., illus., paper, \$1.25. Report of archaeological findings of excavations by the Arizona State Museum and the Museum of New Mexico.

NH₃: Ammonia, Its Uses and Properties—*Commercial Solvents Corp.*, 48 p., illus., paper. Free upon request on business letterhead directly to Commercial Solvents

Corp., 17 East 42 St., New York City. General information on the use of ammonia in agriculture and industry.

NORTHWEST ARGENTINE ARCHAEOLOGY—Wendell C. Bennett, Everett F. Bleiler and Frank H. Sommer—*Yale University Press*, 42 p., illus., paper, \$3.00. A review of literature in this field.

POWER AND PERSONALITY—Harold Dwight Lasswell—*Norton*, 94 p., \$3.00. Pointing to the need for developing the democratic personality among our people and emphasizing the menace of a paranoid psychotic in a position of power. "All mankind might be destroyed by a single paranoid in a position of power who could imagine no grander exit than using the globe as a gigantic funeral pyre."

THE PSYCHOLOGY OF IMAGINATION—Jean-Paul Sartre—*Philosophical Library*, 285 p., \$3.75. A philosophical work by a French novelist and playwright. Translated from the French.

REPORT OF THE FAO MISSION FOR POLAND—*Food and Agriculture Organization of the United Nations*, 159 p., illus., paper, \$2.00. The mission studied the economic and technical problems involved in the rehabilitation and improvement of the food industries, which, they found, are in a state of emergency.

ROCKETS, GUNS AND TARGETS: Rockets, Target Information, Erosion Information, and Hypervelocity Guns Developed During World War II by the Office of Scientific Research and Development—John E. Burchard, Ed.—*Little, Brown*, 482 p., \$6. An official record of Divisions 1, 2, and 3 of the NDRC.

THE THEORY OF MATHEMATICAL MACHINES—Francis J. Murray—*King's Crown*, Rev. ed., 139 p., illus., paper, \$3.00. Contains new chapters on "Electronic Digital Computers" and "Noise, Accuracy and Stability."

Science News Letter, June 26, 1948

GENERAL SCIENCE

SNL Ranks Third in German Reprints of U. S. Articles

➤ OUT of the hundred American magazines that are cooperating with the U. S. Military Government in Germany by allowing their material to be reprinted in Germany, the SCIENCE NEWS LETTER ranks third in the number of times its articles are reprinted.

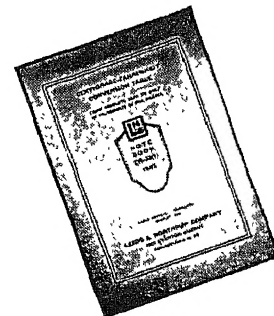
This is revealed in an account of the rebuilding of Germany's information media by Brig. Gen. Robert A. McClure and Col. Gordon E. Textor, former director and director, respectively, of the Information Control Division in Germany. (*Army Information Digest*, June 1948).

"As a service to the 379 licensed maga-

zines currently appearing in Germany, a weekly dispatch of significant articles from the American press, as well as original background pieces, cleared for reprint, is sent to German publishers," the report says.

"A survey of reprinted material over a six-month period shows that articles on popular science are most widely preferred. Other subjects, in the order of their popularity, are: social and political science, agriculture, international affairs, education, the arts, religion, philosophy and psychology, and labor. Articles during this period were selected from 93 magazines and five books. More than 100 United States magazines have granted free reprint rights to all of their material. SENIOR SCHOLASTIC, a publication for American high school students, led the field with 17 reprints, followed by FARMER'S DIGEST, with 15; SCIENCE NEWS LETTER, with 12; and CATHOLIC NEWS and THE CHRISTIAN SCIENCE MONITOR, with 11 each. Still other periodicals with a high average included the NEW YORK TIMES MAGAZINE, the ATLANTIC MONTHLY, and the SATURDAY EVENING POST."

Science News Letter, June 26, 1948



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☼ **HOT OR COLD PACK**, for treatment of bodily ailments, is a flexible vinylite plastic bag in three sections, each filled with a special liquid. Placed in a refrigerator, the liquid congeals to a cold, semi-solid state; placed in hot water, it quickly absorbs heat. In use, it remains cold or hot for a considerable period.

Science News Letter, June 26, 1948

☼ **LABEL FOR MARKING** plants and shrubs is a strip of thin soft white zinc metal which has a narrow extension with a sawtoothed edge to pass around the plant stem and stick through a slot on the label itself, where it is held by the teeth. The label can be inscribed with a special pencil.

Science News Letter, June 26, 1948

☼ **HAIL-PROOF** greenhouse is made of a translucent cloth over a simple framed construction, and contains no panes of glass as in ordinary greenhouses. The cloth is woven of fiber glass yarns and coated with a vinyl resin. This low-cost greenhouse, being tested in Florida, is found satisfactory.

Science News Letter, June 26, 1948

☼ **PORTABLE FAN**, claimed to deliver 87% more air than standard fans of the same size, is mounted on wheels, as shown in the picture, and can be shifted between a three-foot and a five-



foot level. The design of the plastic blades of this 16-inch fan raises its capacity from 1,600 to 2,300 cubic feet of air a minute.

Science News Letter, June 26, 1948

☼ **CUTTING BLOCK**, for such fine materials as rayon and nylon fabric as well as other textiles, leather and paper, where the cutting is done by a guillotine-like machine, is made of a rubber-like plastic which can be made in various degrees of hardness and has excellent resistance to oils and chemicals.

Science News Letter, June 26, 1948

☼ **FLUSHING BEDPAN** can be used on the bed like a conventional bedpan or beside the bed as a commode or regular toilet. It is attached to built-in plumbing outlets by flexible expanding tubes and is portable as far as the lengths of the tubes permit.

Science News Letter, June 26, 1948

☼ **COIN CASE**, the size of the palm of the hand, holds coins of fifty cents and less each in its own compartment, its total capacity being \$3.24. The case, made of a transparent plastic but its contents can be noted without opening the cover.

Science News Letter, June 26, 1948

☼ **NOTEBOOK SUPPORT** for the stenographer is a flat plastic board with a comfortable clamp to fit over the crossed knee. On the knee, it swivels to any desired position, and it may be used as a stand when transcribing.

Science News Letter, June 26, 1948

DDT Death Dealing Thing

For those who like to experiment, Science Service has assembled a kit containing five samples of the insecticide that is doing such an effective job in controlling disease pests.

Two other insecticides included. Timely. Fun to do. Eighteen experiments. Full instructions. Only 50c postpaid.

Question Box

AERONAUTICS-METEOROLOGY

How were safe-speed charts for planes compiled? p. 409.

ENGINEERING

How can building costs be cut? p. 404.

MEDICINE

How can ear damage from streptomycin be prevented? p. 408.

What advances might make victory over cancer nearer? p. 403.

Photographs: Cover, U. S. Coast Guard; p. 403, U. C. L. A.; p. 405, U. S. Air Force; p. 406, Hamilton Wright.

What are the latest high blood pressure aids? p. 404.

What is the new possible remedy for tuberculosis? p. 403.

What new hope is held out to heart patients? p. 406.

NAVIGATION

How are icebergs located and tracked? p. 405.

PSYCHOLOGY

What effect was propaganda found to have on voting? p. 406.

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